

Certification for
Dakota Events Complex
Livestock Complex

South Dakota State Fair
Huron, SD
OSE# M2321--09X
February 25, 2022



Architect:
Ciavarella Design, Inc.

I hereby certify that these plans and specifications have been prepared by me or under my direct supervision and that I am a duly registered Architect under the laws of South Dakota.

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**SECTION 01 1000
SUMMARY****PART 1 - GENERAL****1.1 WORK COVERED BY CONTRACT DOCUMENTS**

- A. Project Identification: Dakota Events CompleX, Livestock Complex
 - 1. Project Location: Huron, South Dakota.
 - 2. Owner: South Dakota State Fair
- B. Architect Identification: The Contract Documents, dated March 4, 2022, were prepared for the Project by Ciavarella Design, Inc., 410 W 2nd Avenue, Suite 4, Mitchell, SD.
- C. The Work consists of the construction of a new pre-engineered clear-span building and masonry block restroom and lobby.
- D. Project will be constructed under a construction manager, Henry Carlson Construction.

1.2 USE OF PREMISES

- A. General: Contractor shall coordinate use of the work area for construction operations during construction period. Contractor's use of premises is limited only by Owner's right to use the facility or to perform work or to retain other contractors on portions of Project.

1.3 WORK UNDER OTHER CONTRACTS

- A. Separate Contract: Construction Manager at Risk and Owner may award a separate contract for performance of certain construction operations at the Project site. Those operations may be conducted simultaneously with work under this Contract.
- B. Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract.

1.4 SPECIFICATION FORMATS AND CONVENTIONS

- A. Specification Format: The Specifications are organized into Divisions and Sections using the 50-division format and CSI/CSC's "MasterFormat" numbering system.
- B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Abbreviated Language: Language used in the Specifications and other Contract Documents are abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred, as the sense requires. Singular words shall be interpreted as plural and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.
 - a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

PART 2 - PRODUCTS (Not Used)**PART 3 - EXECUTION (Not Used)****END OF SECTION 01 1000**

**SECTION 01 2300
ALTERNATES****PART 1 - DEFINITIONS**

- 1.1 Specified Alternate: An amount proposed by bidders and stated on the Bid Form as Alternate for certain work defined in the Bidding Requirements.
- 1.2 Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete description of negotiated modification to alternates. Execute accepted alternates under the same conditions as other work of the Contract.

PART 2 - ACCEPTANCE OF ALTERNATES

- 2.1 Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option.
- 2.2 Coordinate related work and modify surrounding work to integrate the Work of each Alternate.

PART 3 - SCHEDULE OF ALTERNATES

- 3.1 Alternate 2-1 (Bid Package 2): State the amount to be added to Base Bid to provide and place the alternate soil profile in the entire arena space, minus the concrete floor slab, as described in Civil drawings.
- 3.2 Alternate 3-1 (Bid Package 3): State the amount to be added to Base Bid for the construction of the exterior north wash rack. Scope of the ALTERNATE includes basin sinks, steel columns and beams, roof, lighting, and east tie rails and east water line. BASE BID scope includes the concrete walls, west tie rail, west water line, concrete slab, trench drain, and sewer. Refer to Sheet A205.
- 3.3 Alternate 3-2 (Bid Package 3): State the amount to be added to Base Bid for providing and installing ceiling fans in the Arena, as identified in Electrical Plans as CF 1-12 on Sheets E101-102 and M501.
- 3.4 Alternate 3-3 (Bid Package 3): State the amount to be added to Base Bid for adding air conditioning to the Lobby and Restrooms. Refer to Make-Up Air Schedule, Unit MAU-1, on Sheets and M302 and M501.

- 3.5 Alternate 3-4 (Bid Package 3): State the amount to be added to Base Bid for concert venue power provisions, as identified in Electrical plans E101-E102, noted in Electrical Specific Notes as "Company Switch".

END OF SECTION 01 2300

SECTION 01 2600
CONTRACT MODIFICATION PROCEDURES**PART 1 - GENERAL****1.1 SUMMARY**

- A. This Section specifies administrative and procedural requirements for handling and processing Contract modifications.
- B. See Division 01 Section "Allowances" for procedural requirements for handling and processing allowances.
- C. See Division 01 Section "Unit Prices" for administrative requirements for using unit prices.

1.2 MINOR CHANGES IN THE WORK

- A. Architect will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time.

1.3 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Proposal Requests issued by Architect are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
 - 2. Within 10 days after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include costs of labor and supervision directly attributable to the change.
 - d. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

- B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change to Architect.
1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 4. Include costs of labor and supervision directly attributable to the change.
 5. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 6. Comply with requirements in Division 01 Section "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.
- C. Proposal Request Form: Use forms provided by Owner. Sample copies are included on the Office of the State Engineer's website.

1.4 CHANGE ORDER PROCEDURES

- A. The Construction Manager at Risk will issue a Change order to Subcontractor upon acceptance by the Owner.

1.5 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

END OF SECTION 01 2600

**SECTION 01 2900
PAYMENT PROCEDURES****PART 1 - GENERAL****1.1 SUMMARY**

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.2 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.
1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including Application for Payment forms with Continuation Sheets.
 2. Submit the Schedule of Values to Architect at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
 3. Subschedules: Where the Work is separated into phases requiring separately phased payments, provide subschedules showing values correlated with each phase of payment.
- B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section.
1. Identification: Include the following Project identification on the Schedule of Values:
 - a. Project name and location.
 - b. Name of Architect.
 - c. Architect's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 2. Submit draft of AIA Document G703 Continuation Sheets.
 3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.
 4. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 5. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.

6. Allowances: Provide a separate line item in the Schedule of Values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
7. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.
8. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.3 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction Work covered by each Application for Payment is the period indicated in the Agreement.
- C. Payment Application Times: Progress payments shall be submitted to Architect by the 25th of the month. The period covered by each Application for Payment is one month, ending on the last day of the month.
- D. Payment Application Forms: Use AIA Document G702 and AIA Document G703 Continuation Sheets as form for Applications for Payment.
- E. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
 1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
 2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- F. Transmittal: Submit 1 signed and notarized electronic copies of each Application for Payment to Architect by a method ensuring receipt. Include waivers of lien and similar attachments if required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from every entity who is lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 2. When an application shows completion of an item, submit final or full waivers.
 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 4. Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to Owner.
- H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
 2. Schedule of Values.
 3. Contractor's Construction Schedule (preliminary if not final).
 4. Schedule of unit prices.
 5. Submittals Schedule (preliminary if not final).
 6. List of Contractor's staff assignments.
 7. List of Contractor's principal consultants.
 8. Copies of building permits.
 9. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 10. Initial progress report.
 11. Report of preconstruction conference.
 12. Certificates of insurance and insurance policies.
- I. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- J. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.

3. Updated final statement, accounting for final changes to the Contract Sum.
4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
6. AIA Document G707, "Consent of Surety to Final Payment."
7. Evidence that claims have been settled.
8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
9. Final, liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 2900

SECTION 01 3100
PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
1. General Project coordination procedures.
 2. Project meetings.

1.2 COORDINATION

- A. Coordination: Coordinate construction operations included in various Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, which depend on each other for proper installation, connection, and operation.
1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. If necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of Contractor's Construction Schedule.
 2. Preparation of the Schedule of Values.
 3. Installation and removal of temporary facilities and controls.
 4. Delivery and processing of submittals.
 5. Progress meetings.
 6. Pre-installation conferences.
 7. Project closeout activities.

1.3 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at the Project site, unless otherwise indicated.
 - 1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
 - 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 - 3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within 3 days of the meeting.
- B. Preconstruction Conference: Schedule a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.
 - 1. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; manufacturers; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 - 2. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Tentative construction schedule.
 - b. Phasing.
 - c. Critical work sequencing.
 - d. Designation of responsible personnel.
 - e. Procedures for processing field decisions and Change Orders.
 - f. Procedures for processing Applications for Payment.
 - g. Distribution of the Contract Documents.
 - h. Submittal procedures.
 - i. Preparation of Record Documents.
 - j. Use of the premises.
 - k. Responsibility for temporary facilities and controls.
 - l. Parking availability.
 - m. Office, work, and storage areas.
 - n. Equipment deliveries and priorities.
 - o. First aid.
 - p. Security.
 - q. Progress cleaning.
 - r. Working hours.
- C. Pre-installation Conferences: Conduct a pre-installation conference at Project site before each construction activity that requires coordination with other construction.
 - 1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and

installations that have preceded or will follow shall attend the meeting. Advise Architect of scheduled meeting dates.

2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

- a. Contract Documents.
- b. Options.
- c. Related Change Orders.
- d. Purchases.
- e. Deliveries.
- f. Submittals.
- g. Review of mockups.
- h. Possible conflicts.
- i. Compatibility problems.
- j. Time schedules.
- k. Weather limitations.
- l. Manufacturer's written recommendations.
- m. Warranty requirements.
- n. Compatibility of materials.
- o. Acceptability of substrates.
- p. Temporary facilities and controls.
- q. Space and access limitations.
- r. Regulations of authorities having jurisdiction.
- s. Testing and inspecting requirements.
- t. Required performance results.
- u. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements.
4. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

- D. Progress Meetings: Conduct progress meetings at weekly intervals. Coordinate dates of meetings with preparation of payment requests.

1. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from

parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

- b. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.
 - 7) Site utilization.
 - 8) Temporary facilities and controls.
 - 9) Work hours.
 - 10) Hazards and risks.
 - 11) Progress cleaning.
 - 12) Quality and work standards.
 - 13) Change Orders.
 - 14) Documentation of information for payment requests.
- 3. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.
 - a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 3100

**SECTION 01 3300
SUBMITTAL PROCEDURES****PART 1 - GENERAL****1.1 SUMMARY**

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other miscellaneous submittals.
- B. See Division 1 Section "Quality Requirements" for submitting test and inspection reports and Delegated-Design Submittals.
- C. See Division 1 Section "Closeout Procedures" for submitting warranties Project Record Documents and operation and maintenance manuals.

1.2 DEFINITIONS

- A. Action Submittals: Written and graphic information that requires Architect's responsive action.
- B. Informational Submittals: Written information that does not require Architect's approval. Submittals may be rejected for not complying with requirements.

1.3 SUBMITTAL PROCEDURES

- A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 - 2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- B. Processing Time: Allow enough time for submittal review, including time for re-submittals, as follows. Time for review shall commence on Architect's receipt of submittal.
 - 1. Initial Review: 10 days for initial review of each submittal. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. Architect will advise Contractor when a submittal being processed must be delayed for coordination.

2. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing.
- C. Identification: Place a permanent label or title block on each submittal for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
 2. Provide a space approximately 4 by 5 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
 3. Include the following information on label for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name and address of Architect.
 - d. Name and address of Contractor.
 - e. Name and address of subcontractor.
 - f. Name and address of supplier.
 - g. Name of manufacturer.
 - h. Unique identifier, including revision number.
 - i. Number and title of appropriate Specification Section.
 - j. Drawing number and detail references, as appropriate.
 - k. Other necessary identification.
- D. Deviations: Highlight, encircle, or otherwise identify deviations from the Contract Documents on submittals.
- E. Additional Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions of the Contract Documents, initial submittal may serve as final submittal.
- F. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will discard submittals received from sources other than Contractor.
1. Include Contractor's certification stating that information submitted complies with requirements of the Contract Documents.
- G. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- H. Use for Construction: Use only final submittals with mark indicating action taken by Architect in connection with construction.

PART 2 - PRODUCTS

2.1 ELECTRONIC DOCUMENT SUBMITTAL SERVICE

- A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF) format and transmitted via an Internet-based submittal service that receives, logs and stores documents, provides electronic stamping and signatures, and notifies addressees via email.
 - 1. Besides submittals for review, information, and closeout, this procedure applies to progress documentation, contract modification documents (e.g. supplementary instructions, change proposals, change orders), field reports and meeting minutes, and any other document any participant wishes to make part of the project record.
 - 2. Contractor and Architect are required to use this service.
 - 3. It is Contractor's responsibility to submit documents in PDF format.
 - 4. Subcontractors, suppliers, and Architect's consultants will be permitted to use the service at no extra charge.
 - 5. Users of the service need an email address, Internet access, and PDF review software that includes ability to mark up and apply electronic stamps (such as Adobe Acrobat, www.adobe.com, or Bluebeam PDF Revu, www.bluebeam.com), unless such software capability is provided by the service provider.
 - 6. Paper document transmittals will not be reviewed; emailed PDF documents will not be reviewed.
 - 7. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to samples or color selection charts, other physical material samples, applications for payment, requests for Information, and other submittals not related to shop drawing and product data.
- B. Cost: The cost of the service will be paid by the Construction Manager.
- C. Submittal Service: The selected service is:
 - 1. Procore (tel: 1-866-477-6267): www.procore.com.
- D. Project Closeout: Construction Manager will determine when to terminate the service for the project and is responsible for obtaining archive copies of files for Owner.

2.2 ACTION SUBMITTALS

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.
 - 1. Number of Copies: Submit one copy of each submittal electronically in PDF format (email), unless otherwise indicated. Retain one returned copy as a Project Record Document.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 - 1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
 - 2. Mark each copy of each submittal to show which products and options are applicable.
 - 3. Include the following information, as applicable:

- a. Manufacturer's written recommendations.
 - b. Manufacturer's product specifications.
 - c. Manufacturer's installation instructions.
 - d. Manufacturers catalog cuts.
 - e. Wiring diagrams showing factory-installed wiring.
 - f. Printed performance curves.
 - g. Operational range diagrams.
 - h. Compliance with recognized trade association standards.
 - i. Compliance with recognized testing agency standards.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
 - 1. Preparation: Include the following information, as applicable:
 - a. Dimensions.
 - b. Identification of products.
 - c. Fabrication and installation drawings.
 - d. Roughing-in and setting diagrams.
 - e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
 - f. Shop work manufacturing instructions.
 - g. Templates and patterns.
 - h. Schedules.
 - i. Notation of coordination requirements.
 - j. Notation of dimensions established by field measurement.
- D. Samples: Prepare physical units of materials or products, including the following:
 - 1. Comply with requirements in Division 1 Section "Quality Requirements" for mockups.
 - 2. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Submit one full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
 - 3. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from the same material to be used for the Work, cured and finished in manner specified, and physically identical with the product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

- a. Submit three sets of Samples. Architect will retain two Sample sets; remainder will be returned.
- 4. Preparation: Mount, display, or package Samples in manner specified to facilitate review of qualities indicated. Prepare Samples to match Architect's sample where so indicated. Attach label on unexposed side.
- 5. Submit Samples for review of kind, color, pattern, and texture for a final check of these characteristics with other elements and for a comparison of these characteristics between final submittal and actual component as delivered and installed.
- 6. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
- E. Submittals Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation."
- F. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design.

2.3 INFORMATIONAL SUBMITTALS

- A. General: Prepare and submit Informational Submittals required by other Specification Sections.
 - 1. Number of Copies: submit one copy of each submittal electronically in PDF format (email), unless otherwise indicated. Architect will not return copies.
 - 2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
 - 3. Test and Inspection Reports: Comply with requirements in Division 1 Section "Quality Requirements."
- B. Contractor's Construction Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation."
- C. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- D. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements.
- E. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements and, where required, is authorized for this specific Project.

- F. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements. Include evidence of manufacturing experience where required.
- G. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements.
- H. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.
- I. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- J. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements.
- K. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- L. Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project.
- M. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements in Division 1 Section "Closeout Procedures."
- N. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.
- O. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer.
- P. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections.

- Q. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Review each submittal and check for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.
- C. **Submittals not stamped as reviewed by the General Contractor will be returned.**

3.2 ARCHITECT'S ACTION

- A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken.
- C. Informational Submittals: Architect will review each submittal and will not return it, or will reject and return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- D. Submittals not required by the Contract Documents will not be reviewed and may be discarded.

END OF SECTION 01 3300

**SECTION 01 4000
QUALITY REQUIREMENTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. This Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specified tests, inspections, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with the Contract Document requirements.
 - 2. Requirements for Contractor to provide quality-control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
- C. See Divisions 2 through 33 Sections for specific test and inspection requirements.

1.2 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and ensure that proposed construction complies with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that completed construction complies with requirements. Services do not include contract enforcement activities performed by Architect.
- C. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

1.3 DELEGATED DESIGN

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

1.4 SUBMITTALS

- A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.
- C. Reports: Prepare and submit certified written reports that include the following:
 - 1. Date of issue.
 - 2. Project title and number.
 - 3. Name, address, and telephone number of testing agency.
 - 4. Dates and locations of samples and tests or inspections.
 - 5. Names of individuals making tests and inspections.
 - 6. Description of the Work and test and inspection method.
 - 7. Identification of product and Specification Section.
 - 8. Complete test or inspection data.
 - 9. Test and inspection results and an interpretation of test results.
 - 10. Ambient conditions at time of sample taking and testing and inspecting.
 - 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 - 12. Name and signature of laboratory inspector.
 - 13. Recommendations on re-testing and re-inspecting.
- D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- B. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- C. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has

resulted in construction with a record of successful in-service performance. Minimum length of experience for window and door installer – 5 years.

- D. **Manufacturer Qualifications:** A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance.
- E. **Professional Engineer Qualifications:** A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.
- F. **Specialists:** Certain sections of the Specifications require that specific construction activities shall be performed by entities that are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
 - 1. Requirement for specialists shall not supersede building codes and similar regulations governing the Work, nor interfere with local trade-union jurisdictional settlements and similar conventions.
- G. **Testing Agency Qualifications:** An agency with the experience and capability to conduct testing and inspecting indicated, as documented by ASTM E 548, and that specializes in types of tests and inspections to be performed.

1.6 QUALITY CONTROL

- A. **Contractor Responsibilities:** Unless otherwise indicated, provide quality-control services specified and required by authorities having jurisdiction.
 - 1. Required testing shall be the Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
 - a. Contractor shall not employ the same entity engaged by Owner, unless agreed to in writing by Owner.
 - 2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
 - 3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 - 4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 - 5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- B. **Special Tests and Inspections:** Owner will engage a testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner.

1. Testing agency will notify Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 2. Testing agency will submit a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
 3. Testing agency will submit a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
 4. Testing agency will interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
 5. Testing agency will retest and re-inspect corrected work.
- C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing.
- D. Re-testing/Re-inspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including re-testing and re-inspecting, for construction that revised or replaced Work that failed to comply with requirements established by the Contract Documents.
- E. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 3. Submit a certified written report, in duplicate, of each test, inspection and similar quality-control service through Contractor.
 4. Do not release, revoke, alter, or increase requirements of the Contract Documents or approve or accept any portion of the Work.
 5. Do not perform any duties of Contractor.
- F. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 4. Facilities for storage and field curing of test samples.
 5. Delivery of samples to testing agencies.
 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 7. Security and protection for samples and for testing and inspecting equipment at Project site.

- G. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
1. Provide materials and comply with installation requirements specified in other Sections of these Specifications. Restore patched areas and extend restoration into adjoining areas in a manner that eliminates evidence of patching.
 2. Comply with the Contract Document requirements for Division 1 Section "Cutting and Patching."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01 4000

SECTION 01 5000
TEMPORARY FACILITIES AND CONTROLS**PART 1 - GENERAL****1.1 SUMMARY**

- A. This Section includes requirements for temporary facilities and controls, including temporary utilities, support facilities, and security and protection facilities.

1.3 USE CHARGES

- A. General: Cost or use charges for temporary facilities are not chargeable to Owner or Architect and shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces occupants of Project Architect testing and inspecting agencies and personnel of authorities having jurisdiction.
- B. Water Service: Use water from Owner's existing water system without metering and without payment of use charges.
- C. Electric Power Service: Use electric power from Owner's existing system without metering and without payment of use charges.

1.5 QUALITY ASSURANCE

- A. Standards: Comply with ANSI A10.6, NECA's "Temporary Electrical Facilities," and NFPA 241.
 - 1. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.6 PROJECT CONDITIONS

- A. Temporary Utilities: At earliest feasible time, when acceptable to Owner, change over from use of temporary service to use of permanent service.
 - 1. Temporary Use of Permanent Facilities: Installer of each permanent service shall assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.
- B. Conditions of Use: The following conditions apply to use of temporary services and facilities by all parties engaged in the Work:

1. Keep temporary services and facilities clean and neat.
2. Relocate temporary services and facilities as required by progress of the Work.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide new materials. Undamaged, previously used materials in serviceable condition may be used if approved by Architect. Provide materials suitable for use intended.
- B. Lumber and Plywood: Comply with requirements in Division 6 Section Miscellaneous Carpentry.
- E. Tarpaulins: Fire-resistive labeled with flame-spread rating of 15 or less.
- F. Water: Potable.

2.2 EQUIPMENT

- A. Field Offices: Contractor shall provide field office, if necessary.
- B. Fire Extinguishers: Hand carried portable, UL rated. Provide class and extinguishing agent as indicated or a combination of extinguishers of NFPA-recommended classes for exposures.
 1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.
- C. Toilets: Contractor to provide portable toilet facilities.
- D. Drinking-Water Fixtures: On site drinking water fountains will not be available.
- E. Heating Equipment: Contractor to provide temporary heat.
 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
- F. Electrical Outlets: Properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-V plugs into higher-voltage outlets; equipped with ground-fault circuit interrupters, reset button, and pilot light.
- G. Power Distribution System Circuits: Where permitted and overhead and exposed for surveillance, wiring circuits, not exceeding 125-V ac, 20-A rating, and lighting circuits may be nonmetallic sheathed cable.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.
- B. Provide each facility ready for uses when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Engage appropriate local utility company to install temporary service or connect to existing service. Where utility company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with utility company recommendations.
 - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
 - 2. Provide adequate capacity at each stage of construction. Before temporary utility is available, provide trucked-in services.
 - 3. Obtain easements to bring temporary utilities to Project site where Owner's easements cannot be used for that purpose.
- B. Water Service: Use of Owner's existing water service facilities will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
 - 1. Provide rubber hoses as necessary to serve Project site.
 - 2. Where spillage or leakage might damage installations below an outlet, provide a drip pan of suitable size to minimize water damage. Drain accumulated water promptly from pans.
- C. Heating and Cooling:
 - 1. Maintain a minimum temperature of 65 deg F in permanently enclosed portions of building for normal construction activities, and 65 deg F for finishing activities and areas where finished Work has been installed.
- D. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment from that specified that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
- E. Electric Power Service: Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction

period. Include meters, transformers, overload-protected disconnecting means, automatic ground-fault interrupters, and main distribution switchgear.

1. Install power distribution wiring overhead and rise vertically where least exposed to damage.
- F. Electric Power Service: Use of Owner's existing electric power service will be permitted, as long as equipment is maintained in a condition acceptable to Owner.
- G. Electric Distribution: Provide receptacle outlets adequate for connection of power tools and equipment.
1. Provide waterproof connectors to connect separate lengths of electrical power cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.
- H. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations and traffic conditions.
1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

3.3 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
1. Maintain support facilities until near Substantial Completion. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- C. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Containerize and clearly label hazardous, dangerous, or unsanitary waste materials separately from other waste. Provide daily cleaning of the site.
1. If required by authorities having jurisdiction, provide separate containers, clearly labeled, for each type of waste material to be deposited.
- D. Individual Project circumstances may require use of other construction aids and miscellaneous facilities, such as scaffolds, platforms, swing stages, ramps and bridges, incidental sheeting and shoring, and demolition waste chutes. Add requirements to suit Project. See Evaluations.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

1. Where heating or cooling is needed and permanent enclosure is not complete, provide insulated temporary enclosures. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
 2. Vertical Openings: Close openings of 25-sq. ft. or less with plywood or similar materials.
 3. Horizontal Openings: Close openings in floor or roof decks and horizontal surfaces with load-bearing, wood-framed construction.
 4. Install tarpaulins securely using fire-retardant-treated wood framing and other materials.
- B. Temporary Partitions: Erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise.
1. Construct dustproof, floor-to-ceiling partitions of not less than nominal 4-inch studs, and 2 layers of 3-mil polyethylene sheets, inside and outside temporary enclosure. Cover floor with 2 layers of 3-mil polyethylene sheets, extending sheets 18 inches up the sidewalls. Overlap and tape full length of joints. Cover floor with 3/4-inch fire-retardant plywood.
 2. Insulate partitions to provide noise protection to occupied areas.
 3. Seal joints and perimeter. Equip partitions with dustproof doors and security locks.
 4. Protect air-handling equipment.
 5. Weather-strip openings.
- C. Temporary Fire Protection: Until fire-protection needs are supplied by permanent facilities, install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.
1. Provide fire extinguishers, installed on walls on mounting brackets, visible and accessible from space being served, with sign mounted above.
 - a. Locate fire extinguishers where convenient and effective for their intended purpose; provide not less than one extinguisher on each floor at or near each usable stairwell.
 2. Store combustible materials in containers in fire-safe locations.
 3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways, and other access routes for fire fighting. Prohibit smoking in hazardous fire-exposure areas.
 4. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition.
 5. Permanent Fire Protection: At earliest feasible date in each area of Project, complete installation of permanent fire-protection facility, including connected services, and place into operation and use. Instruct key personnel on use of facilities.
 6. Develop and supervise an overall fire-prevention and first aid fire-protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

7. Provide hoses for fire protection of sufficient length to reach construction areas. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.
8. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.5 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage caused by freezing temperatures and similar elements.
 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Temporary Facility Changeover: Except for using permanent fire protection as soon as available, do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 1. Materials and facilities that constitute temporary facilities are the property of Contractor. Owner reserves right to take possession of Project identification signs.
 2. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements in Division 1 Section "Closeout Procedures."

END OF SECTION 01 5000

**SECTION 01 6000
PRODUCT REQUIREMENTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. This Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.
- B. See Division 01 Section "Closeout Procedures" for submitting warranties for Contract closeout.
 - 1. The Pre-Engineered Metal Building and its associated materials will be completed prior to the balance of the project. Warranties provided by the suppliers and subcontractors shall begin on the date of substantial completion of the Pre-Engineered Metal Building. The Construction Manager at Risk shall provide a 1-year workmanship warranty, starting on the Date of Substantial Completion for the entire project.
- C. See Divisions 02 through 49 Sections for specific requirements for warranties on products and installations specified to be warranted.

1.2 DEFINITIONS

- A. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility, except that products consisting of recycled-content materials are allowed, unless explicitly stated otherwise. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
- C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other

designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

1.3 SUBMITTALS

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
1. Substitution Request Form: Use CSI Form 13.1A.
 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified material or product cannot be provided.
 - b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
 - g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - h. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
 - i. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.
 - j. Cost information, including a proposal of change, if any, in the Contract Sum.
 - k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
 - l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
 3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within 7 days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution

within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.

- a. Form of Acceptance: Change Order.
 - b. Use product specified if Architect cannot make a decision on use of a proposed substitution within time allocated.
- B. Comparable Product Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 1. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
 - a. Form of Approval: As specified in Division 01 Section "Submittal Procedures."
 - b. Use product specified if Architect cannot make a decision on use of a comparable product request within time allocated.
- C. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01 Section "Submittal Procedures." Show compliance with requirements.

1.4 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Store cementitious products and materials on elevated platforms.
5. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
7. Protect stored products from damage and liquids from freezing.

1.6 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
 2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 2. Specified Form: When specified forms are included with the Specifications, prepare a written document using appropriate form properly executed.
 3. Refer to Divisions 2 through 16 Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Division 01 Section "Closeout Procedures."

PART 2 - PRODUCTS**2.1 PRODUCT SELECTION PROCEDURES**

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 4. Where products are accompanied by the term "as selected," Architect will make selection.
 5. Where products are accompanied by the term "match sample," sample to be matched is Architect's.
 6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.
- B. Product Selection Procedures:
1. Product: Where Specifications name a single product and manufacturer, provide the named product that complies with requirements.
 2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements.
 3. Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.
 4. Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
 5. Available Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
 6. Available Manufacturers: Where Specifications include a list of manufacturers, provide a product by one of the manufacturers listed, or an unnamed manufacturer, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
 7. Product Options: Where Specifications indicate that sizes, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide the specified product or system. Comply with provisions in Part 2 "Product Substitutions" Article for consideration of an unnamed product or system.
 8. Basis-of-Design Product: Where Specifications name a product and include a list of manufacturers, provide the specified product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles,

dimensions, and other characteristics that are based on the product named. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product by the other named manufacturers.

9. Visual Matching Specification: Where Specifications require matching an established Sample, select a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
 - a. If no product available within specified category matches and complies with other specified requirements, comply with provisions in Part 2 "Product Substitutions" Article for proposal of product.
10. Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product that complies with other specified requirements.
 - a. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that does not include premium items.
 - b. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 PRODUCT SUBSTITUTIONS

- A. Timing: Architect will consider requests for substitution if received within 60 days after the Notice to Proceed. Requests received after that time may be considered or rejected at discretion of Architect.
- B. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 2. Requested substitution does not require extensive revisions to the Contract Documents.
 3. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 4. Substitution request is fully documented and properly submitted.
 5. Requested substitution will not adversely affect Contractor's Construction Schedule.
 6. Requested substitution has received necessary approvals of authorities having jurisdiction.
 7. Requested substitution is compatible with other portions of the Work.

8. Requested substitution has been coordinated with other portions of the Work.
9. Requested substitution provides specified warranty.

2.3 COMPARABLE PRODUCTS

- A. Conditions: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 1. Evidence that the proposed product does not require extensive revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
 2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 3. Evidence that proposed product provides specified warranty.
 4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
 5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 6000

**SECTION 01 7300
EXECUTION****PART 1 - GENERAL****1.1 SUMMARY**

- A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout.
 - 2. Field engineering and surveying.
 - 3. General installation of products.
 - 4. Progress cleaning.
 - 5. Starting and adjusting.
 - 6. Protection of installed construction.
 - 7. Correction of the Work.
- B. See Division 01 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

1.2 SUBMITTALS

- A. Certificates: Submit certificate signed by land surveyor or professional engineer certifying that location and elevation of improvements comply with requirements.
- B. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.
- C. Certified Surveys: Submit two copies signed by land surveyor or professional engineer.
- D. Final Property Survey: Submit two copies showing the Work performed and record survey data.

1.3 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

PART 2 - PRODUCTS (Not Used)**PART 3 - EXECUTION****3.1 EXAMINATION**

- A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.
 - 1. Before construction, verify the location and points of connection of utility services.
- B. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction affecting the Work.
 - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; and underground electrical services.
 - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- C. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
 - 1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 - 2. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 - 3. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 - 4. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before

fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.
- B. General: Engage a land surveyor or professional engineer to lay out the Work using accepted surveying practices.
 - 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
 - 2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 - 3. Inform installers of lines and levels to which they must comply.
 - 4. Check the location, level and plumb, of every major element as the Work progresses.
 - 5. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
 - 6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 FIELD ENGINEERING

- A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
- B. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
 - 1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
- C. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.
- D. Final Property Survey: Prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor or professional engineer, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.
 - 1. Recording: At Substantial Completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey."

3.5 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - 3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that

adequate provisions are made for locating and installing products to comply with indicated requirements.

- G. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
 - 2. Allow for building movement, including thermal expansion and contraction.
 - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
 - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 - 2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F.
 - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 - 1. Remove liquid spills promptly.
 - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.7 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 01 Section "Quality Requirements."

3.8 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.9 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 01 Section "Cutting and Patching."

1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 01 7300

**SECTION 01 7329
CUTTING AND PATCHING****PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for cutting and patching.

1.3 SUBMITTALS

- A. Cutting and Patching Proposal: Submit a proposal describing procedures well in advance of the time cutting and patching will be performed if the Owner requires approval of these procedures before proceeding. Request approval to proceed. Include the following information, as applicable, in the proposal:
 - 1. Describe the extent of cutting and patching required. Show how it will be performed and indicate why it cannot be avoided.
 - 2. Describe anticipated results in terms of changes to existing construction. Include changes to structural elements and operating components as well as changes in the building's appearance and other significant visual elements.
 - 3. List products to be used and firms or entities that will perform Work.
 - 4. Indicate dates when cutting and patching will be performed.
 - 5. Approval by the Architect to proceed with cutting and patching does not waive the Architect's right to later require complete removal and replacement of unsatisfactory work.

1.4 QUALITY ASSURANCE

- A. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would change their load-carrying capacity or load-deflection ratio.
 - 1. Obtain approval of the cutting and patching proposal before cutting and patching the following structural elements:
 - a. Bearing and retaining walls.
 - b. Structural steel.

- c. Lintels.
 - d. Timber and primary wood framing.
 - e. Structural decking.
 - g. Miscellaneous structural metals.
 - i. Equipment supports.
 - j. Piping, ductwork, vessels, and equipment.
- B. Operational Limitations: Do not cut and patch operating elements or related components in a manner that would result in reducing their capacity to perform as intended. Do not cut and patch operating elements or related components in a manner that would result in increased maintenance or decreased operational life or safety.
 - 1. Obtain approval of the cutting and patching proposal before cutting and patching the following operating elements or safety related systems:
 - a. Primary operational systems and equipment.
 - b. Air or smoke barriers.
 - c. Water, moisture, or vapor barriers.
 - d. Membranes and flashings.
 - e. Fire protection systems.
 - f. Noise and vibration control elements and systems.
 - g. Control systems.
 - h. Communication systems.
 - i. Electrical wiring systems.
- C. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in the Architect's opinion, reduce the building's aesthetic qualities. Do not cut and patch construction in a manner that would result in visual evidence of cutting and patching. Remove and replace construction cut and patched in a visually unsatisfactory manner.

1.5 WARRANTY

- A. Existing Warranties: Replace, patch, and repair material and surfaces cut or damaged by methods and with materials in such a manner as not to void any warranties required or existing.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible if identical materials are

unavailable or cannot be used. Use materials whose installed performance will equal or surpass that of existing materials.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed before cutting. If unsafe or unsatisfactory conditions are encountered, take corrective action before proceeding.

3.2 PREPARATION

- A. Temporary Support: Provide temporary support of work to be cut.
- B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Project that might be exposed during cutting and patching operations.
- C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Avoid cutting existing pipe, conduit, or ductwork serving the building but scheduled to be removed or relocated until provisions have been made to bypass them.

3.3 PERFORMANCE

- A. General: Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.
 - 1. Cut existing construction to provide for installation of other components or performance of other construction activities and the subsequent fitting and patching required to restore surfaces to their original condition.
- B. Cutting: Cut existing construction using methods least likely to damage elements retained or adjoining construction. Where possible, review proposed procedures with the original Installer; comply with the original Installer's recommendations.
 - 1. In general, where cutting, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

2. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
- C. Patching: Patch with durable seams that are as invisible as possible. Comply with specified tolerances.
1. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
 2. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 3. Where removing walls or partitions extends one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform color and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a smooth painted surface, extend final paint coat over entire unbroken surface containing the patch after the area has received primer and second coat.
 4. Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance. Reinstall or replace batt and blown-in insulation where ceilings are disturbed.

3.4 CLEANING

- A. Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar items. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.

END OF SECTION 01 7329

**SECTION 01 7700
CLOSEOUT PROCEDURES****PART 1 - GENERAL****1.1 SUMMARY**

- A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Inspection procedures.
 - 2. Operation and maintenance manuals – 3 hard copies, 1 electronic copy.
 - 3. As-built drawings.
 - 4. Warranties.
 - 5. Instruction of Owner's personnel.
 - 6. Final cleaning.
- B. See Division 1 Section "Payment Procedures" for requirements for Applications for Payment for Substantial and Final Completion.
- C. See Divisions 2 through 16 Sections for specific closeout and special cleaning requirements for products of those Sections.

1.2 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
 - 1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
 - 2. Advise Owner of pending insurance changeover requirements.
 - 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 5. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs, damage or settlement surveys, property surveys, and similar final record information.
 - 6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
 - 7. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 - 8. Advise Owner of changeover in utilities.

9. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
 10. Complete final cleaning requirements, including touchup painting.
 11. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.
 2. Results of completed inspection will form the basis of requirements for Final Completion.

1.3 FINAL COMPLETION

- A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
1. Submit a final Application for Payment according to Division 1 Section "Payment Procedures."
 2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 4. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.4 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Preparation: Submit three copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction

including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.

1.5 OPERATION AND MAINTENANCE MANUALS

- A. See Section 01 7823 "Operation and Maintenance Data".

1.6 WARRANTIES

- A. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
 1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
- C. Provide additional copies of each warranty to include in operation and maintenance manuals.

1.7 AS BUILT DRAWINGS

- A. See Section 01 7839 "Project Record Documents".

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION**3.1 DEMONSTRATION AND TRAINING**

- A. See Section 01 7900 "Demonstration and Training".

3.2 FINAL CLEANING

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and anti-pollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturers written instructions.
 - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - c. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - d. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - e. Sweep concrete floors broom-clean in unoccupied spaces.
 - f. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
 - g. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - h. Remove labels that are not permanent.
 - i. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already shows evidence of repair or restoration.
 - 1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.

- j. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - k. Replace parts subject to unusual operating conditions.
 - l. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - m. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - n. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
 - o. Leave Project clean and ready for occupancy.
- C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 01 7700

SECTION 01 7823
OPERATION AND MAINTENANCE DATA**PART 1 - GENERAL****1.1 SUMMARY**

- A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Operation manuals for systems, subsystems, and equipment.
 - 2. Maintenance manuals for the care and maintenance of products, materials, and finishes, systems, and equipment.
- B. See Divisions 02 through 49 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

1.2 SUBMITTALS

- A. Manual: Submit one (1) copy of each manual in final form at least seven (7) days before final inspection. Architect will return copy with comments within fifteen (15) days after final inspection.
 - 1. Correct or modify each manual to comply with Architect's comments. Submit two (2) copies of each corrected manual within fifteen (15) days of receipt of Architect's comments.

PART 2 - PRODUCTS**2.1 MANUALS, GENERAL**

- A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain a title page, table of contents, and manual contents.
 - 1. Title Page.
 - 2. Table of Contents.
 - 3. Manual Contents.
- B. Title Page: Enclose title page in transparent plastic sleeve. Include the following information:
 - 1. Subject matter included in manual.
 - 2. Name and address of Project.
 - 3. Name and address of Owner.
 - 4. Date of submittal.
 - 5. Name, address, and telephone number of Contractor.
 - 6. Name and address of Architect.

- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
 - 1. Binders: Heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
 - a. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.
 - 2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
 - 3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software diskettes for computerized electronic equipment.
 - 4. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
 - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
 - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.2 OPERATION MANUALS

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and equipment descriptions, operating standards, operating procedures, operating logs, wiring and control diagrams, and license requirements.
 - 1. System, subsystem, and equipment descriptions.
 - 2. Operating procedures.
 - 3. Wiring diagrams.
 - 4. Control diagrams.
 - 5. Piped system diagrams.
 - 6. License requirements including inspection and renewal dates.
- B. Descriptions: Include the following:
 - 1. Product name and model number.

2. Manufacturer's name.
 3. Equipment identification with serial number of each component.
 4. Equipment function.
 5. Operating characteristics.
- C. Operating Procedures: Include start-up, break-in, and control procedures; stopping and normal shutdown instructions; routine, normal, seasonal, and weekend operating instructions; and required sequences for electric or electronic systems.
1. Startup procedures.
 2. Equipment or system break-in procedures.
 3. Routine and normal operating instructions.
 4. Instructions on stopping.
 5. Normal shutdown instructions.
 6. Seasonal and weekend operating instructions.
 7. Special operating instructions and procedures.
- D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.3 PRODUCT MAINTENANCE MANUAL

- A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.
- C. Product Information: Include the following, as applicable:
1. Product name and model number.
 2. Manufacturer's name.
 3. Color, pattern, and texture.
- D. Maintenance Procedures: Include manufacturer's written recommendations and inspection procedures, types of cleaning agents, methods of cleaning, schedule for cleaning and maintenance, and repair instructions.
1. Inspection procedures.
 2. Types of cleaning agents to be used and methods of cleaning.
 3. Repair instructions.

- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 - 1. Include procedures to follow and required notifications for warranty claims.

2.4 SYSTEMS AND EQUIPMENT MAINTENANCE MANUAL

- A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.
- B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.
- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including maintenance instructions, drawings and diagrams for maintenance, nomenclature of parts and components, and recommended spare parts for each component part or piece of equipment:
 - 1. Standard printed maintenance instructions and bulletins.
 - 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
 - 3. Identification and nomenclature of parts and components.
- D. Maintenance Procedures: Include test and inspection instructions, troubleshooting guide, disassembly instructions, and adjusting instructions, that detail essential maintenance procedures:
 - 1. Test and inspection instructions.
 - 2. Troubleshooting guide.
 - 3. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - 4. Aligning, adjusting, and checking instructions.
- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
 - 1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
 - 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

- F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

- A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- B. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
 - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
 - 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- C. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
 - 1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
- D. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation.
 - 1. Do not use original Project Record Documents as part of operation and maintenance manuals.
 - 2. Comply with requirements of newly prepared Record Drawings in Division 01 Section "Project Record Documents."
- E. Comply with Division 01 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 01 7823

**SECTION 01 7839
PROJECT RECORD DOCUMENTS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for Project Record Documents, including the following:
 - 1. Record Drawings.
 - 2. Record Specifications.
 - 3. Record Product Data.

1.3 SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit one (1) set of marked-up Record Prints.
 - 2. Number of Copies: Submit copies of Record Drawings as follows:
 - a. Initial Submittal: Submit one (1) set of marked-up Record Prints. Architect will initial and date each print and mark whether general scope of changes, additional information recorded, and quality of markups are acceptable and legible. Architect will return prints for organizing into sets, printing, binding, and final submittal.
 - 1) Final Submittal: Submit one (1) set of original marked-up Record Prints, and two (2) copies printed from Record Transparencies. Print each Drawing, whether or not changes and additional information were recorded.
- B. Record Specifications: Submit one (1) copy of Project's Specifications, including addenda and contract modifications.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one set of blue- or black-line white prints of the Contract Drawings and Shop Drawings.

1. Preparation: Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an understandable drawing technique.
 - c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
 2. Content: Types of items requiring marking include, but are not limited to, the following:
 - a. Dimensional changes to Drawings.
 - b. Revisions to details shown on Drawings.
 - c. Revisions to electrical circuitry.
 - d. Changes made by Change Order or Construction Change Directive.
 - e. Changes made following Architect's written orders.
 3. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
 4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
 6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Newly Prepared Record Drawings: Prepare new Drawings instead of preparing Record Drawings where Architect determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.
1. New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.
 2. Consult Architect for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared Record Drawings into Record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.
- C. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints: Organize Record Prints and newly prepared Record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 2. Identification: As follows:

- a. Project name.
- b. Date.
- c. Designation "PROJECT RECORD DRAWINGS."
- d. Name of Architect.
- e. Name of Contractor.

2.2 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
 - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 - 3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
 - 4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
 - 5. Note related Change Orders, and Record Drawings where applicable.

2.3 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.
- B. Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.

END OF SECTION 01 7839

**SECTION 01 7900
DEMONSTRATION AND TRAINING****PART 1 - GENERAL****1.1 SUMMARY**

- A. This Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
 - 1. Demonstration of operation of systems, subsystems, and equipment.
 - 2. Training in operation and maintenance of systems, subsystems, and equipment.
 - 3. Demonstration and training videotapes.
- B. See Divisions 02 through 49 Sections Sections for specific requirements for demonstration and training for products in those Sections.

1.2 SUBMITTALS

- A. Instruction Program: Submit two copies of outline of instructional program for demonstration and training, including a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.

1.3 QUALITY ASSURANCE

- A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.
- B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 01 Section "Quality Requirements," experienced in operation and maintenance procedures and training.
- C. Preinstruction Conference: Conduct conference at Project site. Review methods and procedures related to demonstration and training.
- D. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect.

PART 2 - PRODUCTS**2.1 INSTRUCTION PROGRAM**

- A. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following:
1. Basis of System Design, Operational Requirements, and Criteria: Include system and equipment descriptions, operating standards, regulatory requirements, equipment function, operating characteristics, limiting conditions, and performance curves.
 2. Documentation: Review emergency, operations, and maintenance manuals; Project Record Documents; identification systems; warranties and bonds; and maintenance service agreements.
 3. Emergencies: Include instructions on stopping; shutdown instructions; operating instructions for conditions outside normal operating limits; instructions on meaning of warnings, trouble indications, and error messages; and required sequences for electric or electronic systems.
 4. Operations: Include startup, break-in, control, and safety procedures; stopping and normal shutdown instructions; routine, normal, seasonal, and weekend operating instructions; operating procedures for emergencies and equipment failure; and required sequences for electric or electronic systems.
 5. Adjustments: Include alignments and checking, noise, vibration, economy, and efficiency adjustments.
 6. Troubleshooting: Include diagnostic instructions and test and inspection procedures.
 7. Maintenance: Include inspection procedures, types of cleaning agents, methods of cleaning, procedures for preventive and routine maintenance, and instruction on use of special tools.
 8. Repairs: Include diagnosis, repair, and disassembly instructions; instructions for identifying parts; and review of spare parts needed for operation and maintenance.

PART 3 - EXECUTION**3.1 INSTRUCTION**

- A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.
- B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
1. Owner will furnish an instructor to describe Owner's operational philosophy.
- C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

1. Schedule training with Owner, with at least seven days' advance notice.

END OF SECTION 01 7900

SECTION 02 3000 SUBSURFACE INVESTIGATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The general provisions of the contract, including General and Supplementary Conditions and the provisions of Division I - General Requirements, apply to the work specified in this section.

1.2 SCOPE AND DESCRIPTION

- A. This section describes the Contractor's requirements relative to the subsurface investigations to be completed on this project.

1.3 SOIL INFORMATION

- A. A Report of Subsurface Exploration has been completed by Geotek Engineering, dated June 3, 2021, for this project and is provided for reference following this specification section.
- B. The Contractor shall accept the project site in its present condition. It shall be the Contractor's responsibility to determine to his own satisfaction the location and nature of all surface and sub-surface obstacles and the soils and water conditions which will be encountered during the construction of the proposed project.
- C. Additional test borings and other exploratory operations as may be desired shall be made by the Contractor at no cost to the Owner.

PART 2 – PRODUCTS (not used)

PART 3 - EXECUTION

3.1 GENERAL

- A. Unless otherwise required, the Contractor shall return all areas disturbed by him to their original grade and seed or sod in accordance with the specifications.
- B. All testing or borings completed by the Contractor shall be scheduled and performed with the permission of the Owner.

END OF SECTION 02 3000



**GEOTEK ENGINEERING
& TESTING SERVICES, INC.**

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Phone 605-335-5512 Fax 605-335-0773

June 3, 2021

Office of the State Engineer
Joe Foss Building
523 E. Capitol Avenue
Pierre, South Dakota 57501

Attn: Brandon Carda, EIT

Subj: Geotechnical Exploration
Proposed Dakota Events Complex
South Dakota State Fairgrounds
Huron, South Dakota
OSE #M2321 -- 09X
GeoTek #21-771

This correspondence presents our written report of the geotechnical exploration program for the referenced project. We performed our work in accordance with our contractual agreement with the Office of the State Engineer. We are transmitting an electronic copy of our report for your use. An additional copy of our report is being sent as noted below.

We thank you for the opportunity of providing our services on this project and look forward to continued participation during the design and construction phases. If you have any questions regarding this report, please contact our office at (605) 335-5512.

Respectfully Submitted,
GeoTek Engineering & Testing Services, Inc.

Nick Bierle

Nick Bierle, PE
Project Engineer

Cc: Albertson Engineering, Inc., Attn: Blake Tideman, PE

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**GEOTECHNICAL EXPLORATION
PROPOSED DAKOTA EVENTS COMPLEX
SOUTH DAKOTA STATE FAIRGROUNDS
HURON, SOUTH DAKOTA
OSE #M2321 -- 09X
GEOTEK #21-771**

INTRODUCTION

Project Information

This report presents the results of the recent geotechnical exploration program for the proposed Dakota Events Complex at the South Dakota State Fairgrounds in Huron, South Dakota.

Scope of Services

Our work was performed in accordance with our contractual agreement with the Office of the State Engineer. The scope of work as presented in this report is limited to the following:

1. To perform 12 standard penetration test (SPT) borings to gather data on the subsurface conditions at the site.
2. To perform laboratory tests that include moisture content, dry density, sieve analysis (#200 sieve wash), Atterberg limits (liquid and plastic) and unconfined compressive strength.
3. To prepare an engineering report that includes the results of the field and laboratory tests as well as our earthwork and foundation recommendations for design and construction.

The scope of our work was intended for geotechnical purposes only. This scope of work did not include determining the presence or extent of environmental contamination at the site or to characterize the site relative to wetlands status.

SITE & SUBSURFACE CONDITIONS

Site Location & Description

The site is located at the South Dakota State Fairgrounds (west of the sheep barn) in Huron, South Dakota. A site location map (Figure 1) are attached showing the location of the site. The

site currently has a building, gravel surfaced areas and concrete pavement areas. A building was also recently removed in the area of the new building.

Ground Surface Elevations & Test Boring Locations

The ground surface elevations at the test boring locations were determined by using the finished floor elevation (FFE) of the sheep barn as a benchmark. An elevation of 1,285.0 feet was used for the benchmark. Based on the benchmark datum, the ground surface elevations at the test boring locations varied from 1,282.8 feet at test boring 11 to 1,286.3 feet at test boring 8. A test boring location map (Figure 2) is attached showing the location of the test borings.

Subsurface Conditions

Twelve (12) test borings were performed at the site on May 24, 2021. Of the 12 test borings, 11 test borings (test borings 1 through 11) were performed for the building and 1 test boring (test boring 12) were performed in the pavement areas. The subsurface conditions encountered at the test boring locations are illustrated by means of the boring logs included in Appendix A.

The subsurface profile at the test boring locations consisted of the following soil types: existing fill materials, fine alluvium soils, mixed alluvium soils, coarse alluvium soils, glacial outwash soils and glacial till soils. The existing fill materials were encountered at all of the test borings. The thickness of the existing fill materials varied from 2 feet to 7 feet, with the exception of test boring 5 where a thickness of 11 feet was encountered. The fine alluvium soils were only encountered at test borings 3 and 6. Layers of mixed alluvium soils and coarse alluvium soils were encountered below the existing fill materials and fine alluvium soils at the majority of the test borings. The coarse alluvium soils extended to the termination depth at test borings 1, 4 and 5. The glacial outwash soils were only encountered at test boring 9 and extended to the termination depth of the test boring. The glacial till soils were encountered at test borings 2, 3, 6, 7, 8, 9, 10 and 11. The glacial till soils extended to the termination depth of these test borings, with the exception of test boring 9.

The existing fill materials consisted of lean clay (CL), lean clay with sand (CL), sandy lean clay (CL) and clayey sand (SC). The fine alluvium soils consisted of lean clay with sand (CL). The

mixed alluvium soils consisted of sandy lean clay (CL). The coarse alluvium soils consisted of clayey sand (SC), sand with silt (SP-SM) and sand (SP). The glacial outwash soils consisted of clayey sand (SC). The glacial till soils consisted of lean clay with sand (CL) and sandy lean clay (CL).

The consistency or relative density of the soils is indicated by the standard penetration resistance (“N”) values as shown on the boring log. A description of the soil consistency or relative density based on the “N” values can be found on the attached Soil Boring Symbols and Descriptive Terminology data sheet.

We wish to point out that the subsurface conditions at other times and locations at the site may differ from those found at our test boring locations. If different conditions are encountered during construction, then it is important that you contact us so that our recommendations can be reviewed.

Water Levels

Measurements to record the groundwater levels were made at the test boring locations. The time and level of the groundwater readings are recorded on the boring logs. Also, a summary of the groundwater levels is shown in Table 1.

The water levels may or may not be an accurate indication of the depth or lack of subsurface groundwater. The limited length of observation restricts the accuracy of the measurements. Long term groundwater monitoring was not included in our scope of work.

Table 1. Groundwater Levels

Test Boring	Ground Surface Elevation, ft	Groundwater Level, ft	Elevation of Groundwater, ft
1	1,285.7	8 ½	1,277.2
2	1,285.2	11 ½	1,273.7
3	1,283.8	8 ½	1,275.3
4	1,286.1	9	1,277.1
5	1,285.2	11	1,274.2
6	1,284.1	9	1,275.1
7	1,285.7	8	1,277.7
8	1,286.3	11	1,275.3
9	1,283.7	7	1,276.7
10	1,285.1	10	1,275.1
11	1,282.8	5	1,277.8
12	1,284.6	Dry	---

Note: Test boring 12 was a “shallow” boring.

ENGINEERING REVIEW & RECOMMENDATIONS

Project Design Data

We understand that the project will consist of constructing a new Dakota Events Complex at the South Dakota State Fairgrounds in Huron, South Dakota. The building will be a slab-on-grade structure with a footprint area of 200,000 square feet. We assume that the FFE of the building will be near 1,285.0 feet. Based on the assumed FFE, filling and cutting of up to 2 feet will be needed to achieve the finished floor elevation. We anticipate that foundation support for the building will be provided by perimeter footings resting below frost depth and interior footings resting at or slightly below the floor slab. We understand that the maximum column loads will be on the order of 200 kips and the maximum wall loads will be on the order of 10 kips per lineal foot (klf). A portion (western quarter) of the floor area will be concrete and the remainder will be a clay (“dirt”) floor. We understand that the building will be heated during the winter. We expect light to moderate floor loads for the building. Pavement areas will also be constructed on the north end of the building. We expect that the vehicle traffic will consist of automobiles and large

trucks. Grading within the pavement areas will likely involve filling, but no significant grade changes.

The information/assumptions detailed in the project design data section are important factors in our review and recommendations. If there are any corrections or additions to the information detailed in this section, then it is important that you contact us so that we can review our recommendations with regards to the revised plans.

Building

Discussion

In our opinion, a spread footing foundation system can be used for support of the proposed building after the recommended site preparation has been performed.

We recommend that the footings (interior and exterior) be supported by the coarse alluvium soils or glacial till soils. Regarding the floor slab, the existing fill materials could be considered for indirect support if the owner is willing to accept some risk for some movement of the floor slab. With that said, the recommendations provided in the report are dependent on the type of floor area (paved or unpaved).

Site Preparation – Footings

The site preparation for the footings (interior and exterior) of the building should consist of removing the pavements, gravel surfacing, existing fill materials, fine alluvium soils and mixed alluvium soils in order to expose the coarse alluvium soils or glacial till soils. Additionally, any construction debris associated with the existing/previous structures should be removed as well as any utilities should be rerouted. We also recommend that the coarse alluvium soils exposed at the bottom of the excavations be recompacted using a large smooth vibratory drum roller. The recompacted soils should be observed along with compaction testing being performed on the exposed soils.

If the excavation required to expose the coarse alluvium soils or glacial till soils extends below the bottom-of-footing elevation, then we recommend placing and compacting granular

structural fill up to the bottom-of-footing elevation. Please refer to Table 2 for a summary of the anticipated minimum excavation depths to remove the unsuitable soils encountered at the test borings performed for the building.

Table 2. Estimated Excavation Depths – Footings

Test Boring Number	Ground Surface Elevation, ft	Anticipated Excavation Depth, ft	Approximate Excavation Elevation, ft
1	1,285.7	7	1,278.7
2	1,285.2	2	1,283.2
3	1,283.8	3 ½	1,280.3
4	1,286.1	2	1,284.1
5	1,285.2	11	1,274.2
6	1,284.1	4 ½	1,279.6
7	1,285.7	6	1,279.7
8	1,286.3	4 ½	1,281.8
9	1,283.7	4 ½	1,279.2
10	1,285.1	4 ½	1,280.6
11	1,282.8	2	1,280.8

Site Preparation – Concrete Floor Slab Area

If movement of the concrete floor slab is critical to the performance of the building, then the site preparation for the floor slab should consist of removing pavements, gravel surfacing and existing fill materials. Additionally, any construction debris associated with the existing/previous structures should be removed as well as any utilities should be rerouted. Following the removals, we recommend placing and compacting granular structural fill up to the bottom-of-slab elevation. If flooring adhesives will be used on top of the concrete surface, then the final 6 inches should consist of select granular fill. If flooring adhesives will not be used on top of the concrete surface, then a base course material or granular structural fill material may be used as backfill for the final 6 inches. Consult the floor covering manufacturer for more recommendations if flooring adhesives will be used.

If the existing fill materials are removed, then it is our opinion that the floor slab can be designed using a soil modulus of subgrade reaction (k value) of 175 psi/inch.

Alternative Site Preparation Option – Concrete Floor Slab Area

An alternative site preparation option could be considered for the floor slab (paved areas) if the owner will assume the risk of floor slab movement. The alternative site preparation option would consist of removing any pavements, gravel surfacing, any vegetation/highly organic materials or excavating to a minimum depth of 18 inches below the bottom-of-slab elevation, whichever is greater. In addition, any existing utilities should be rerouted. Following the removals, we recommend compacting the exposed subgrade with a large sheepsfoot roller. We also recommend that observations and compaction testing of existing fill materials be performed on the materials exposed at the bottom of the excavation. Unstable areas or areas having low density will likely require further excavation. Once the subgrade is approved, granular structural fill should be placed and compacted up to the design grade. Again, if flooring adhesives will be used on top of the concrete surface, then the final 6 inches should consist of select granular fill. If flooring adhesives will not be used on top of the concrete surface, then a base course material or granular structural fill material may be used as backfill for the final 6 inches. Consult the floor covering manufacturer for more recommendations if flooring adhesives will be used.

If this option is chosen, then the owner will assume some risk of floor slab distress due to potential settlement of the existing fill materials that are left in-place. This option should only be considered in the floor slab areas.

If the existing fill materials are used for indirect support (alternative site preparation option), then it is our opinion that the floor slab can be designed using a soil modulus of subgrade reaction (k value) of 125 psi/inch.

Site Preparation – “Dirt” Floor Area

The site preparation in the “dirt” floor areas should consist of removing the vegetation and highly organic soils (typically the upper 6 to 12 inches). In addition, any existing utilities should be rerouted. Following the removals, we recommend that observations and testing (compaction tests) be performed on the materials exposed at the bottom of the excavation. Unstable areas or areas having low density will likely require further excavation. Once the subgrade is approved, general structural fill should be placed and compacted up to the design elevation.

It should be noted that if the area will be paved in the future, then we recommend that the recommendations detailed in the sections for the concrete floor slab areas be followed.

Excavation

All excavations within the footprint of the building should be performed with a track backhoe with a smooth edge bucket. The soils are vulnerable to disturbance and can experience strength loss caused by construction traffic and/or additional moisture. If any soils become disturbed during construction, then the disturbed soils will likely need to be removed.

Water & Saturated Soils

If water or saturated soils are encountered at the bottom of an excavation, then we recommend placing a layer (6 inches to 12 inches) of crushed rock at the bottom of the excavation prior to the placement of the granular structural fill, select granular fill or footings.

Laterally Oversized Excavations

Where granular structural fill or drainage rock is needed below the footings, the bottom of the excavation should be laterally oversized 1 foot beyond the edges of the footings for each vertical foot of granular structural fill or drainage rock required below the footings (1 horizontal : 1 vertical).

Foundation Loads & Settlement

If our recommendations are followed during site preparations, then it is our opinion that the footings of the building can be sized for a net allowable soil bearing pressure of up to 4,000 pounds per square foot (psf). With the expected loads, net allowable soil bearing pressure and our site preparation recommendations, total settlement of the footings should be less than 1 inch and differential settlement should be less than ½ inch over 50 feet. Unknown soil conditions at the site that are different from those depicted at the test boring locations could increase the amount of expected settlement.

Retaining Walls

We recommend backfilling any retaining walls with free-draining sand. The active lateral earth pressures may be employed only if movement of the walls can be tolerated to reach the active state. A horizontal movement of approximately 1/500 of the height of the wall would be required to develop the active state for granular soils. If the above movement cannot be tolerated, then we recommend using the at-rest lateral earth pressures to design the walls. The zone of the sand backfill should extend a minimum of 2 feet outside the bottom of the foundation and then extend upward and outward at a slope no steeper than 1:1 (horizontal to vertical). Also, we recommend capping the sand backfill section with 1 foot to 2 feet of clayey soil in areas that will not have asphalt or concrete surfacing to minimize infiltration of surface waters. Table 3 shows the equivalent fluid unit weight values for the various soil types anticipated for this project.

Table 3. Equivalent Fluid Unit Weight Values

Soil Type	At-Rest, pcf		Active, pcf		Passive, pcf	
	Drained	Submerged	Drained	Submerged	Drained	Submerged
Clay	-	-	-	-	220*	115*
Free-Draining Sand (SP)	50	90	35	80	460*	230*

*Value below frost depth – 0 pcf above frost depth.

The passive resistance in front of a retaining wall should not be used in an analysis unless the wall extends well below the depth of frost penetration due to loss of strength upon thawing. In addition, development of passive lateral earth pressure in the soil in front of a wall requires a relatively large rotation or outward displacement of the wall. Therefore, we do not recommend using passive resistance in front of the wall for the analysis.

During backfill operations, bracing and/or shoring of the walls may be needed. Only hand-operated compaction equipment should be used directly adjacent to the walls.

Dewatering

Dewatering will likely not be needed during construction. However, if dewatering is needed, then the contractor should provide appropriate dewatering methods and equipment. In areas where clay soils are encountered, it will likely be possible to remove and control water entering

the excavations using normal sump pumping techniques. If waterbearing sand soils are encountered, then an extensive dewatering system will likely be needed.

Perimeter Drain Tile Recommendations

Since the building will be slab-on-grade, it is our opinion that drain tile is not needed along the perimeter of the building. If any portion of the building will be below-grade, then we recommend that drain tile be installed.

Seismic Site Classification

Based on the 2018 International Building Code (IBC), it is our opinion that the site, as a whole, corresponds to a Site Class D (stiff soil). Also, the ground acceleration values are as follows: $S_s = 0.145$ g, $S_1 = 0.033$ g, $S_{MS} = 0.231$ g, $S_{M1} = 0.079$ g, $S_{DS} = 0.154$ g, $S_{D1} = 0.053$ g. Therefore, the seismic design category is “A”. The ground acceleration values are based on the ASCE 7-16 (referenced standard for 2018 IBC) with Risk Category II. If needed, we can provide ground acceleration values for a different design code.

Pavement Areas

Subgrade Preparation

We recommend removing the gravel surfacing and any vegetation and/or highly organic soils (typically the upper 6 inches). In addition, any construction debris from the previous and existing buildings should also be removed. Following the removals, the subgrade should be prepared by cutting or filling to the design elevations.

Once the design subgrade elevations have been achieved, we recommend that the exposed subgrade be scarified to a minimum depth of 8 inches and adjusted to a moisture level that is 1 percent to 4 percent below the optimum moisture content as determined by standard Proctor (ASTM:D698). The scarification should be performed by a disc harrow and not a road grader with teeth. The moisture-conditioned soils should then be compacted to a minimum density of 95 percent of standard Proctor (ASTM:D698). The scarification is not needed in areas where sand soils are present.

After the subgrade has been scarified and re-compacted, we recommend that a proof roll be performed on the exposed subgrade with a truck weighing 20 tons to 30 tons. During the proof roll, unstable areas in the subgrade should be delineated from stable areas. An unstable area would be considered a location with at least 1 inch of rutting or deflection. Unstable areas will need additional corrections to provide a uniform and stable subgrade condition. Additional corrections may include the following: moisture conditioning the soils (e.g. drying the soils by scarification), an overexcavation to remove and replace the unstable subgrade soils, the placement of a woven geotextile fabric at the subgrade surface, and/or the placement of a granular subbase material at or below the subgrade surface. The type of correction performed should be determined after observing the performance of the subgrade during the proof roll test. We expect that stable conditions will be encountered during drier periods of the year, while some unstable conditions could be encountered during wetter periods of the year (late fall and the spring thaw) or if saturated soils are encountered.

Pavement Section Thickness

We expect that the vehicle traffic will consist of automobiles and occasional trucks (garbage and delivery trucks). Table 4 shows the recommended pavement section thicknesses based on the subsurface conditions and subgrade preparation.

Table 4. Recommended Pavement Section Thicknesses

Pavement Description	Pavement Surfacing, in	Aggregate Base Course, in
Light Duty Areas		
Asphalt:	4	8
PC Concrete:	5	6
Heavy Duty Areas		
Asphalt:	5	10
PC Concrete:	8	8

Notes: Based on the assumption that a stable subgrade is achieved during construction. A geotextile fabric could be installed beneath the aggregate base course material to extend the life of the pavement.

As stated above (below the table), the use of a geotextile fabric below the aggregate base course could be considered to extend the life of the pavement and reduce maintenance over the life of the pavement. If geotextile fabric is used, then we recommend that the geotextile fabric consist of Mirafi HP 370, Propex Geotex 3x3 HF, Huesker Comtrac P 45/45 or an approved alternative.

The geotextile fabric should be placed beneath the aggregate base course. The manufacturer's guidelines should be followed during the installation of the geotextile fabric.

The asphalt pavement should meet the requirements of sections 320 and 321 for Class G. We recommend the concrete pavement meet the requirements of Section 380 of the SDDOT Standard Specifications.

It should be noted that routine maintenance such as crack filling, localized patching, and seal coating should be expected with all pavements in our recommendations. The above designs could be reduced if the owner is willing to assume additional maintenance costs or potentially shorter pavement life.

Excavation – Pavement Areas

If soils with elevated moisture content levels are encountered, then low-ground-pressure construction equipment should be used within the pavement areas.

Frost Protection

Footings

We recommend that all footings be placed at a sufficient depth for frost protection. The perimeter footings for heated buildings should be placed such that the bottom of the footing is a minimum of 4 feet below the finished exterior grade. Interior footings in heated buildings can be placed beneath the floor slab. Footings for unheated areas and canopies, or footings that are not protected from frost during freezing temperatures, should be placed such that the bottom of the footing is a minimum of 5 feet below the finished exterior grade.

Surface Improvements

Surface improvements, such as pavements, patios and sidewalks, are potentially subject to both cosmetic and structural damage caused by frost heaving. The surface improvements should be designed to accommodate the potential frost movements, or granular material should be placed beneath the surface improvements. If movement cannot be tolerated, then we recommend placing granular material beneath the surface improvements. The granular material should extend to a

depth of 4 feet below the finished exterior grade. If it is desired to reduce (but not eliminate) the amount of potential frost heave, then we recommend consideration be given to placing 2 feet of granular material beneath the surface improvements.

Material Types & Compaction Levels

General Structural Fill – The general structural fill should consist of either a granular or clay material. If granular materials are used, then it should consist of the granular structural fill as described below. If a clay material is selected, then it should consist of a non-organic clay having a liquid limit less than 45. It is our opinion that the majority of the on-site clay soils could be used as general structural fill. Any organic materials should not be used as general structural fill. Scrutiny on the clay material's moisture content should be made prior to the acceptance and use. It should be noted that granular materials are preferred due to ease of placement and compaction, as well as they are more resistant to construction disturbance.

Granular Structural Fill – The granular structural fill should consist of a pit-run or processed sand or gravel having a maximum particle size of 3 inches with less than 15 percent by weight passing the #200 sieve. The granular structural fill should be placed in lifts of up to 1 foot in thickness.

Select Granular Fill – The select granular fill should consist of a medium to coarse grained, free-draining sand or rock having a maximum particle size of 1 inch with less than 5 percent by weight passing the #200 sieve. The select granular fill should be placed in lifts of up to 1 foot in thickness.

Crushed Rock – The crushed rock should be washed and meet the gradation specifications shown in Table 5.

Table 5. Crushed Rock Gradation Specifications

Sieve Size	Percent Passing
1 1/2-inch	100
1-inch	70 – 90
3/4-inch	25 – 50
3/8-inch	0 – 5

Free-Draining Sand – The free-draining sand should have a maximum particle size of 1 inch with less than 5 percent by weight passing the #200 sieve. The free-draining sand should be placed in lifts of up to 1 foot in thickness.

Exterior Foundation Wall Backfill for Slab-on-Grade Structures – We recommend either clay or granular soils be used. Debris, organic material, or over-sized material should not be used as backfill. If granular soils are used in areas that will not have asphalt or concrete surfacing, then we recommend capping the granular soils with at least 1 foot to 2 feet of clay soils to minimize infiltration of surface water. The exterior backfill should be placed in lifts of up to 1 foot in thickness.

Interior Foundation Wall Backfill for Slab-on-Grade Structures – We recommend that granular structural fill be used to backfill the interior side of the foundation walls. The interior backfill should be placed in lifts of up to 1 foot in thickness.

Subgrade Fill – The subgrade fill should consist of either a granular or clay material. Debris, organic material, or over-sized material should not be used as subgrade fill. If a granular material is used, then it should consist of a pit-run or processed sand or gravel having a maximum particle size of 3 inches. The granular material can be placed in lifts of up to 1 foot in thickness. If a clay material is selected, then it should consist of a non-organic clay having a liquid limit less than 45. Scrutiny on the clay material's moisture content should be made prior to the acceptance and use. The clay fill should be placed in lifts of up to 6 inches in thickness. The majority of the on-site soils could be used could be used as subgrade fill. Some drying will likely be needed with the on-site soils. Organic materials should not be used as subgrade fill.

Aggregate Base Course Material – We recommend that the aggregate base course materials meet the requirements of Sections 260 and 882 of the SDDOT Standard Specifications.

Recommended Compaction Levels – The recommended compaction levels listed in Table 6 are based on a material's maximum dry density value, as determined by a standard Proctor (ASTM: D698) test.

Table 6. Recommended Compaction Levels

Placement Location	Compaction Specifications
Below Footings	98%
Below Floor Slabs	95%
Exterior Foundation Wall Backfill for Slab-on-Grade Structures	95%
Behind Retaining Walls	95% - 98%
Subgrade Fill	95%
Aggregate Base Course	97%
Granular Subbase	97%
Utility Trench Backfill in Structural Areas	95%
Non-Structural Areas	90%

Notes: Compaction specifications are not applicable with the drainage rock. Compaction testing may not be practical for the granular subbase due to the large aggregate.

Recommended Moisture Levels – The moisture content of the clay backfill materials should be maintained within a range of plus 2 percent to minus 2 percent of the materials' optimum moisture content. The optimum moisture content should be determined using a standard Proctor (ASTM: D698) test. The moisture content of the granular backfill materials should be maintained at a level that will be conducive for vibratory compaction.

Drainage

Proper drainage should be maintained during and after construction. The general site grading should direct surface run-off waters away from the excavations. Water which accumulates in the excavations should be removed in a timely manner.

Finished grades around the perimeter of the structure should be sloped such that positive drainage away from the structure is provided. Also, a system to collect and channel roof run-off waters away from the structure is suggested.

CONSTRUCTION CONSIDERATIONS

Groundwater & Surface Water

Water may enter the excavations due to subsurface water, precipitation or surface run off. Any water that accumulates in the bottom of the excavations should be immediately removed and surface drainage away from the excavations should be provided during construction.

Disturbance of Soils

The soils encountered at the test boring locations are susceptible to disturbance and can experience strength loss caused by construction traffic and/or additional moisture. Precautions will be required during earthwork activities in order to reduce the risk of soil disturbance.

Cold Weather Precautions

If site preparation and construction is anticipated during cold weather, then we recommend all foundations, slabs and other improvements that may be affected by frost movements be insulated from frost penetration during freezing temperatures. If filling is performed during freezing temperatures, then all frozen soils, snow and ice should be removed from the areas to be filled prior to placing the new fill. The new fill should not be allowed to freeze during transit, placement and compaction. Concrete should not be placed on frozen subgrades. Frost should not be allowed to penetrate below the footings. If floor slab subgrades freeze, then we recommend the frozen soils be removed and replaced, or completely thawed, prior to placement of the floor slab. The subgrade soils will likely require reworking and recompacting due to the loss of density caused by the freeze/thaw process.

Excavation Sideslopes

The excavations must comply with the requirements of OSHA 29 CFR, Part 1926, Subpart P, “Excavations and Trenches”. This document states that the excavation safety is the responsibility of the contractor. Reference to this OSHA requirement should be included in the project specifications.

Observations & Testing

This report was prepared using a limited amount of information for the project and a number of assumptions were necessary to help us develop our conclusions and recommendations. It is recommended that our firm be retained to review the geotechnical aspects of the final design plans and specifications to check that our recommendations have been properly incorporated into the design documents.

The recommendations submitted in this report have been made based on the subsurface conditions encountered at the test boring locations. It is possible that there are subsurface conditions at the site that are different from those represented by the test borings. As a result, on-site observation during construction is considered integral to the successful implementation of the recommendations. We believe that qualified field personnel need to be on-site at the following times to observe the site conditions and effectiveness of the construction.

Excavation

We recommend that a geotechnical engineer or geotechnical engineering technician working under the direct supervision of a geotechnical engineer observe all excavations for foundations, slabs and pavements. These observations are recommended to determine if the exposed soils are similar to those encountered at the test boring locations, if unsuitable soils have been adequately removed and if the exposed soils are suitable for support of the proposed construction. These observations should be performed prior to placement of fill or foundations.

Testing

After the subgrade is observed by a geotechnical engineer/technician and approved, we recommend a representative number of compaction tests be taken during the placement of the structural fill and backfill placed below foundations, slabs and pavements, beside foundation walls and behind retaining walls. The tests should be performed to determine if the required compaction has been achieved. As a general guideline, we recommend at least 1 test be taken for every 2,000 square feet of structural fill placed in building and pavement areas, at least 1 test for every 75 feet to 100 feet in trench fill, and for every 2-foot thickness of fill or backfill placed.

The actual number of tests should be left to the discretion of the geotechnical engineer. Samples of proposed fill and backfill materials should be submitted to our laboratory for testing to determine their compliance with our recommendations and project specifications.

SUBSURFACE EXPLORATION PROCEDURES

Test Borings

We performed 12 SPT borings on May 24, 2021 with a truck rig equipped with hollow-stem auger. Soil sampling was performed in accordance with the procedures described in ASTM:D1586. Using this procedure, a 2-inch O.D. split barrel sampler is driven into the soil by a 140-pound weight falling 30 inches. After an initial set of 6 inches, the number of blows required to drive the sampler an additional 12 inches is known as the penetration resistance, or “N” value. The “N” value is an index of the relative density of cohesionless soils and the consistency of cohesive soils. In addition, thin walled tube samples were obtained according to ASTM:D1587, where indicated by the appropriate symbol on the boring logs.

The test borings were backfilled with on-site materials and some settlement of these materials can be expected to occur. Final closure of the holes is the responsibility of the client or property owner.

The soil samples collected from the test boring locations will be retained in our office for a period of 1 month after the date of this report and will then be discarded unless we are notified otherwise.

Soil Classification

As the samples were obtained in the field, they were visually and manually classified by the crew chief according to ASTM:D2488. Representative portions of all samples were then sealed and returned to the laboratory for further examination and for verification of the field classification. In addition, select samples were then submitted to a program of laboratory tests. Where laboratory classification tests (sieve analysis and Atterberg limits) have been performed, classifications according to ASTM:D2487 are possible. Logs of the test borings indicating the

depth and identification of the various strata, the “N” value, the laboratory test data, water level information and pertinent information regarding the method of maintaining and advancing the drill holes are also attached in Appendix A. Charts illustrating the soil classification procedures, the descriptive terminology and the symbols used on the boring logs are also attached in Appendix A.

Water Level Measurements

Subsurface groundwater levels should be expected to fluctuate seasonally and yearly from the groundwater readings recorded at the test boring locations. Fluctuations occur due to varying seasonal and yearly rainfall amounts and snowmelt, as well as other factors. It is possible that the subsurface groundwater levels during or after construction could be significantly different than the time the test borings were performed.

Laboratory Tests

Laboratory tests were performed on select samples to aid in determining the index properties of the soils. The index tests consisted of moisture content, dry density, sieve analysis (#200 sieve wash) and unconfined compressive strength. The laboratory tests were performed in accordance with the appropriate ASTM procedures. The results of the laboratory tests are shown on the boring logs opposite the samples upon which the tests were performed or on the data sheets included in the Appendix.

LIMITATIONS

The recommendations and professional opinions submitted in this report were based upon the data obtained through the sampling and testing program at the test boring locations. We wish to point out that because no exploration program can totally reveal the exact subsurface conditions for the entire site, conditions between test borings and between samples and at other times may differ from those described in our report. Our exploration program identified subsurface conditions only at those points where samples were retrieved or where water was observed. It is not standard engineering practice to continuously retrieve samples for the full depth of the test borings. Therefore, strata boundaries and thicknesses must be inferred to some extent.


Additionally, some soils layers present in the ground may not be observed between sampling intervals. If the subsurface conditions encountered at the time of construction differ from those represented by our test borings, it is necessary to contact us so that our recommendations can be reviewed. The variations may result in altering our conclusions or recommendations regarding site preparation or construction procedures, thus, potentially affecting construction costs.

This report is for the exclusive use of the addressee and its representatives for use in design of the proposed project described herein and preparation of construction documents. Without written approval, we assume no responsibility to other parties regarding this report. Our conclusions, opinions and recommendations may not be appropriate for other parties or projects.

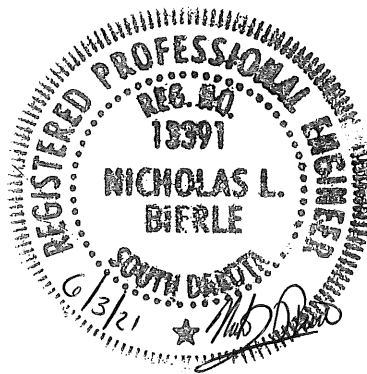
STANDARD OF CARE

The recommendations submitted in this report represent our professional opinions. Our services for your project were performed in a manner consistent with that level of care and skill ordinarily exercised by members of the engineering profession currently practicing at this time and area.

This report was prepared by:
GeoTek Engineering & Testing Services, Inc.



Nick Bierle, PE
Project Engineer



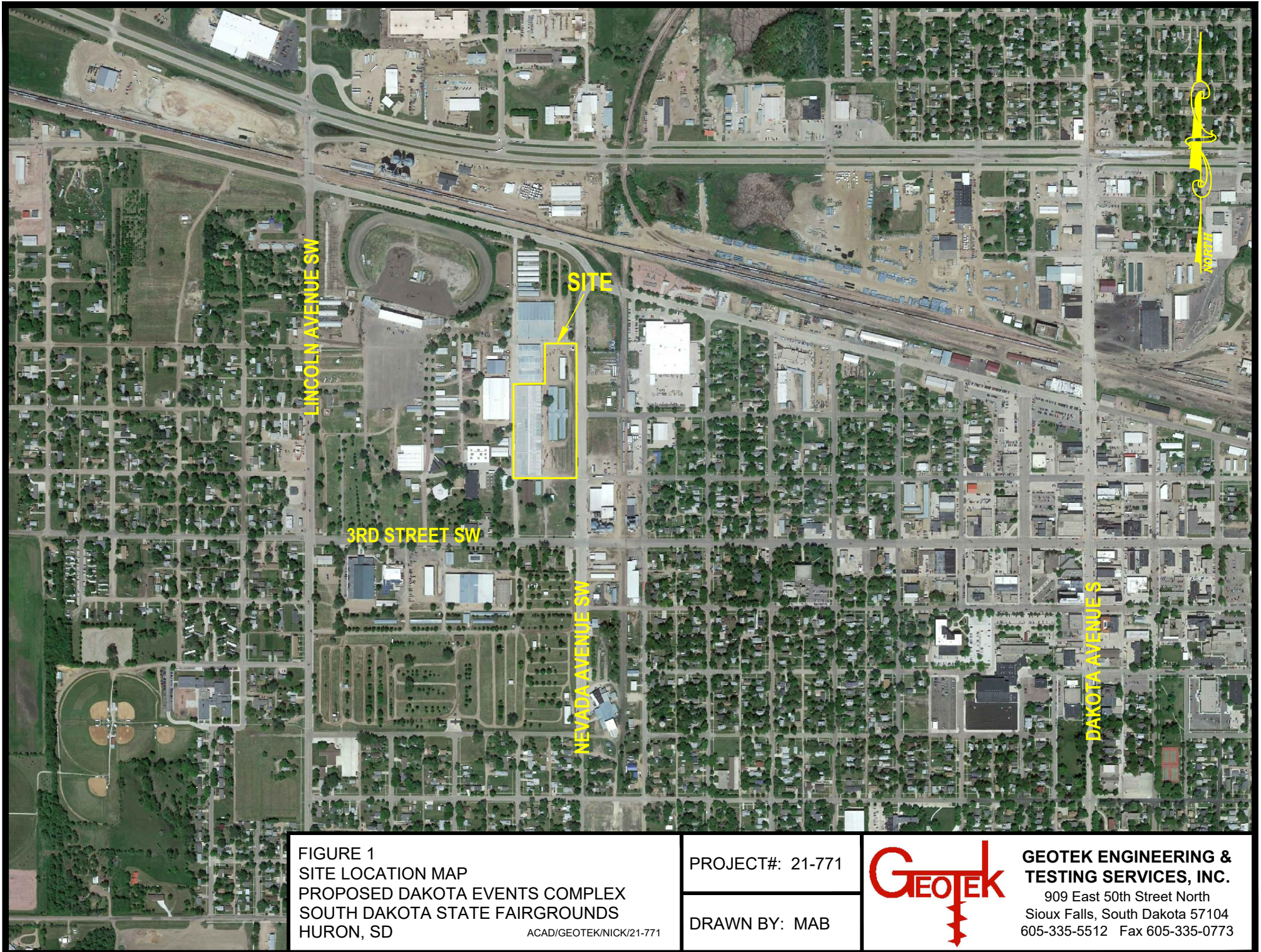


FIGURE 1
SITE LOCATION MAP
PROPOSED DAKOTA EVENTS COMPLEX
SOUTH DAKOTA STATE FAIRGROUNDS
HURON, SD

ACAD/GEOTEK/NICK/21-771

PROJECT#: 21-771

DRAWN BY: MAB



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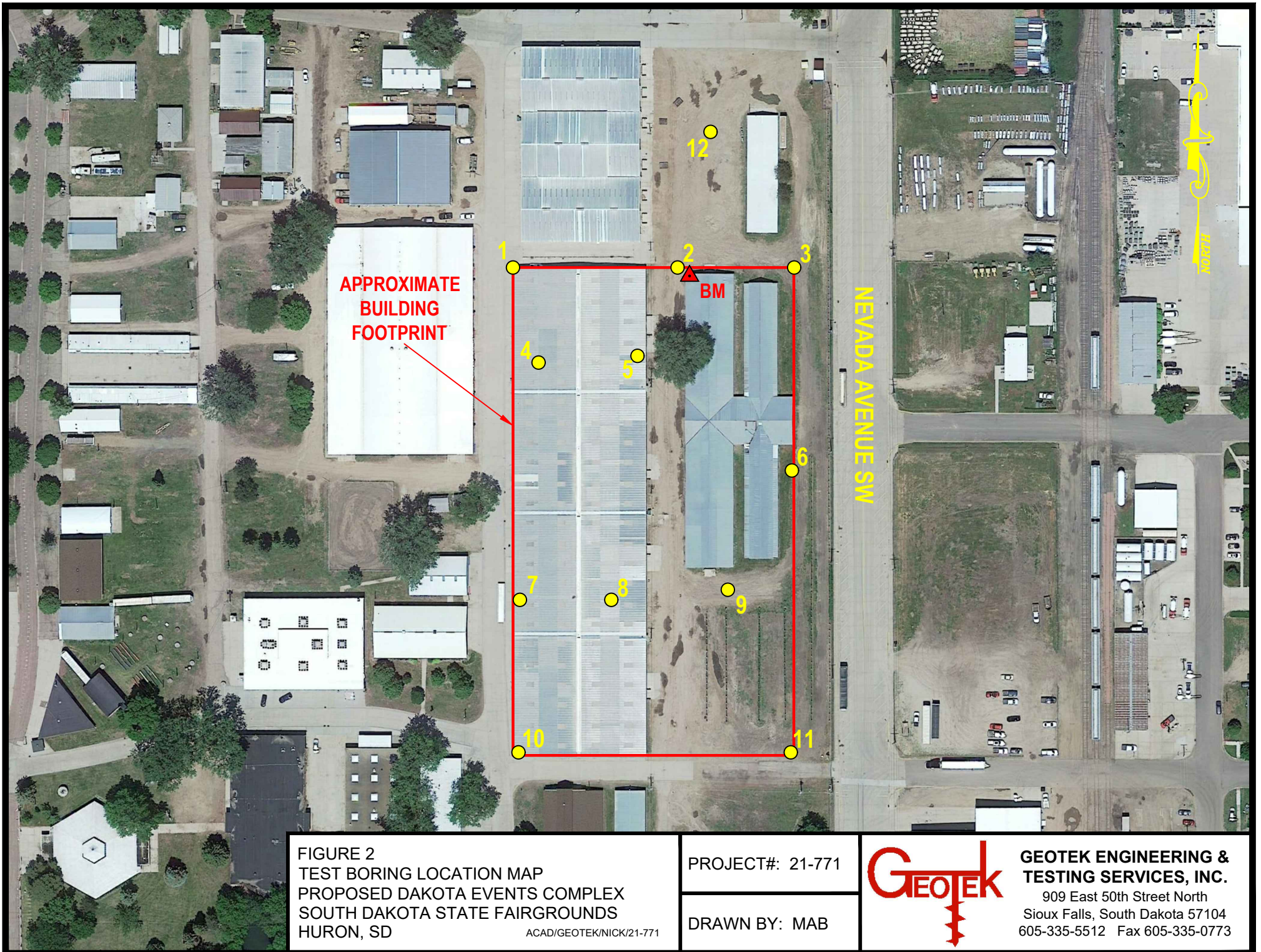


FIGURE 2
TEST BORING LOCATION MAP
PROPOSED DAKOTA EVENTS COMPLEX
SOUTH DAKOTA STATE FAIRGROUNDS
HURON, SD

ACAD/GEOTEK/NICK/21-771

PROJECT#: 21-771

DRAWN BY: MAB



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GEOTECHNICAL TEST BORING LOG

GEOTEK # **21-771**

BORING NO. **1 (1 of 1)**

PROJECT **Proposed Dakota Events Complex, South Dakota State Fairgrounds, OSE #M2321--09X, Huron, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE		LABORATORY TESTS					
					NO.	TYPE	WC	D	LL	PL	QU	
	↓ SURFACE ELEVATION 1285.7 ft											
7 <												

GEOTECHNICAL TEST BORING 21-771.GPJ GEOTEKENG.GDT 6/3/21














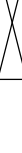


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GEOTECHNICAL TEST BORING LOG

GEOTEK # **21-771**

BORING NO. **2 (1 of 1)**

PROJECT **Proposed Dakota Events Complex, South Dakota State Fairgrounds, OSE #M2321-09X, Huron, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE		LABORATORY TESTS					
					NO.	TYPE	WC	D	LL	PL	QU	
	↓ SURFACE ELEVATION 1285.2 ft											
	FILL, MOSTLY SANDY LEAN CLAY: with gravel, brown		FILL			1	 HSA					
2	CLAYEY SAND: a trace of gravel, fine to medium grained, brown, loose, percent passing #200 sieve = 26% (at 3') (SC)		COARSE ALLUVIUM	6		2	 SPT					
4	SAND WITH SILT: fine grained, brown, medium dense, (SP-SM)		COARSE ALLUVIUM	7		3	 SPT					
6	CLAYEY SAND: a trace of gravel, fine grained, brown, dry to waterbearing, loose to medium dense, (SC)		COARSE ALLUVIUM	6		4	 SPT					
9½	SAND WITH SILT: fine grained, dark brown, medium dense, (SP-SM)		COARSE ALLUVIUM	11		5	 SPT					
12	SANDY LEAN CLAY: gray, moist, very stiff, (CL)		MIXED ALLUVIUM	21	▼	6	 SPT	18				
14½	LEAN CLAY WITH SAND: a trace of gravel, gray, moist, firm, (CL)		GLACIAL TILL	8		7	 SPT					
16	Bottom of borehole at 16 feet.											
WATER LEVEL MEASUREMENTS				START	5-24-21	COMPLETE	5-24-21 4:50 pm					
DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL	METHOD						
5-24-21	4:52 pm	16	--	12	▼ 11.5	3.25" ID Hollow Stem Auger						
--	--	--	--	--	--							
--	--	--	--	--	--							
--	--	--	--	--	--	CREW CHIEF Roy Hanson						

GEOTECHNICAL TEST BORING 21-771.GPJ GEOTEKENG.GDT 6/3/21



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GEOTECHNICAL TEST BORING LOG

GEOTEK # **21-771**

BORING NO. **3 (1 of 1)**

PROJECT **Proposed Dakota Events Complex, South Dakota State Fairgrounds, OSE #M2321--09X, Huron, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE		LABORATORY TESTS				
					NO.	TYPE	WC	D	LL	PL	QU
	↓ SURFACE ELEVATION <u>1283.8 ft</u>										
2	FILL, MOSTLY LEAN CLAY: dark brown, moist	FILL			1	HSA					
3½	LEAN CLAY WITH SAND: brown, moist, firm, (CL)	FINE ALLUVIUM	6		2	SPT	16	110			
	SAND: a trace of gravel, fine to medium grained, brown, dry to waterbearing, loose, percent passing #200 sieve = 5% (at 7') (SP)	COARSE ALLUVIUM	6		3	SPT					
			6		4	SPT					
9½	CLAYEY SAND: a trace of gravel, fine to medium grained, brown, waterbearing, medium dense, (SC)	COARSE ALLUVIUM	15		5	SPT					
12	LEAN CLAY WITH SAND: a trace of gravel, gray, moist, stiff, (CL)	GLACIAL TILL	9		6	SPT					
			9		7	SPT					
16	Bottom of borehole at 16 feet.										

WATER LEVEL MEASUREMENTS

START 5-24-21 COMPLETE 5-24-21 6:07 pm

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL	METHOD
5-24-21	6:06 pm	16	--	10	8.5	3.25" ID Hollow Stem Auger
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--	--	--	--	--	--	
--	--	--	--	--	--	
						CREW CHIEF Roy Hanson

GEOTECHNICAL TEST BORING 21-771.GPJ GEOTEKENG.GDT 6/3/21





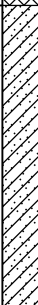








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GEOTECHNICAL TEST BORING LOG

GEOTEK # **21-771**

BORING NO. **4 (1 of 1)**

PROJECT **Proposed Dakota Events Complex, South Dakota State Fairgrounds, OSE #M2321--09X, Huron, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE		LABORATORY TESTS					
					NO.	TYPE	WC	D	LL	PL	QU	
	↓ SURFACE ELEVATION 1286.1 ft											
2	FILL, MOSTLY LEAN CLAY WITH SAND: a trace of gravel, brown		FILL			1	 HSA	19		44	15	
	CLAYEY SAND: dark brown, moist, very loose to loose, percent passing #200 sieve = 27% (at 3') (SC)		COARSE ALLUVIUM	8	2	 SPT						
6				3	3	 SPT						
	SAND WITH SILT: a trace of gravel, fine to medium grained, brown, moist, loose to dense, (SP-SM)		COARSE ALLUVIUM	6	4	 SPT						
11				18	5	 SPT						
	SAND WITH SILT: a trace of gravel, fine to medium grained, gray, waterbearing, dense, (SP-SM)		COARSE ALLUVIUM	23	6	 SPT						
16				21	7	 SPT						
	Bottom of borehole at 16 feet.											
WATER LEVEL MEASUREMENTS			START 5-24-21 COMPLETE 5-24-21 11:49 am									
DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL	METHOD						
5-24-21	11:49 am	16	--	12	 9.0	3.25" ID Hollow Stem Auger						
--	--	--	--	--	--							
--	--	--	--	--	--							
--	--	--	--	--	--	CREW CHIEF Roy Hanson						

GEOTECHNICAL TEST BORING 21-771.GPJ GEOTEKENG.GDT 6/3/21



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GEOTECHNICAL TEST BORING LOG

GEOTEK # <u>21-771</u>						BORING NO. <u>5 (1 of 1)</u>					
PROJECT <u>Proposed Dakota Events Complex, South Dakota State Fairgrounds, OSE #M2321--09X, Huron, SD</u>											
DEPTH in FEET	DESCRIPTION OF MATERIAL ↓ SURFACE ELEVATION <u>1285.2 ft</u>	GEOLOGIC ORIGIN	N	WL	SAMPLE		LABORATORY TESTS				
					NO.	TYPE	WC	D	LL	PL	QU
2	FILL, MOSTLY CLAYEY SAND: with gravel, fine to medium grained, brown, moist, 6 inches of gravel at top	FILL			1	HSA					
	FILL, MOSTLY SANDY LEAN CLAY: a trace of gravel, brown, moist	FILL	6		2	SPT	13	108			
4½	FILL, MOSTLY CLAYEY SAND: fine to medium grained, brown, moist to wet	FILL	6		3	SPT	16	102			
			5		4	SPT	17				
			4		5	SPT	22	101			
11	CLAYEY SAND: fine grained, brown to gray, waterbearing, medium dense, (SC)	COARSE ALLUVIUM									
			14		6	SPT					
			10		7	SPT					
16	Bottom of borehole at 16 feet.										
WATER LEVEL MEASUREMENTS						START <u>5-24-21</u> COMPLETE <u>5-24-21 4:05 pm</u>					
DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL	METHOD					
5-24-21	4:06 pm	16	--	13	11	3.25" ID Hollow Stem Auger					
--	--	--	--	--	--						
--	--	--	--	--	--						
--	--	--	--	--	--	CREW CHIEF Roy Hanson					

GEOTECHNICAL TEST BORING 21-771.GPJ GEOTEKENG.GDT 6/3/21



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GEOTECHNICAL TEST BORING LOG

GEOTEK # **21-771**

BORING NO. **6 (1 of 1)**

PROJECT **Proposed Dakota Events Complex, South Dakota State Fairgrounds, OSE #M2321-09X, Huron, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL ↓ SURFACE ELEVATION 1284.1 ft	GEOLOGIC ORIGIN	N	WL	SAMPLE		LABORATORY TESTS						
					NO.	TYPE	WC	D	LL	PL	QU		
2 4½ 7 12 16	FILL, MOSTLY LEAN CLAY WITH SAND: dark brown, dry	FILL	6 8 11 11 10 13	<div>▼</div>	1	HSA	16	108		45	19	3500	
	LEAN CLAY WITH SAND: brown, moist, firm, (CL)	FINE ALLUVIUM			2	SPT							
	SAND: a trace of gravel, fine to medium grained, brown, dry, loose, (SP)	COARSE ALLUVIUM			3	SPT							
	LEAN CLAY WITH SAND: a trace of gravel, grayish brown, moist, stiff, (CL)	GLACIAL TILL			4	SPT							
					5	SPT							
	LEAN CLAY WITH SAND: a little gravel, gray, moist, stiff, (CL)	GLACIAL TILL			6	SPT							
					7	SPT							
Bottom of borehole at 16 feet.													
WATER LEVEL MEASUREMENTS						START 5-24-21 COMPLETE 5-24-21 6:45 pm							
DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL	METHOD 3.25" ID Hollow Stem Auger							
5-24-21	6:43 pm	16	--	12	▼ 9								
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--	--	--	--	--	--	CREW CHIEF Roy Hanson							

GEOTECHNICAL TEST BORING 21-771.GPJ GEOTEKENG.GDT 6/3/21








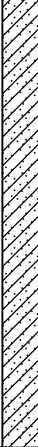





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GEOTECHNICAL TEST BORING LOG

GEOTEK # **21-771**

BORING NO. **7 (1 of 1)**

PROJECT **Proposed Dakota Events Complex, South Dakota State Fairgrounds, OSE #M2321--09X, Huron, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE		LABORATORY TESTS					
					NO.	TYPE	WC	D	LL	PL	QU	
	↓ SURFACE ELEVATION 1285.7 ft											
	FILL, MOSTLY LEAN CLAY WITH SAND: a trace of gravel, brown		FILL			1	 HSA					
			6			2	 SPT	16		32	15	
4½	SANDY LEAN CLAY: gray, moist, firm, (CL)		MIXED ALLUVIUM	7		3	 SPT	15	103			
6	CLAYEY SAND: a trace of gravel, fine to medium grained, brown, wet, loose, (SC)		COARSE ALLUVIUM									
			7	▼	4	 SPT						
			6		5	 SPT						
12	LEAN CLAY WITH SAND: a trace of gravel, gray, moist, firm, Refusal at 14.5 feet, might be a big boulder in the till (CL)		GLACIAL TILL	7		6	 SPT					
			9		7	 SPT						
16	Bottom of borehole at 16 feet.											
WATER LEVEL MEASUREMENTS				START 5-24-21 COMPLETE 5-24-21 12:26 pm								
DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL	METHOD						
5-24-21	12:42 pm	16	--	8	▼ 8.0	3.25" ID Hollow Stem Auger						
--	--	--	--	--	--							
--	--	--	--	--	--							
--	--	--	--	--	--	CREW CHIEF Roy Hanson						

GEOTECHNICAL TEST BORING 21-771.GPJ GEOTEKENG.GDT 6/3/21



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GEOTECHNICAL TEST BORING LOG

GEOTEK # **21-771**

BORING NO. **8 (1 of 1)**

PROJECT **Proposed Dakota Events Complex, South Dakota State Fairgrounds, OSE #M2321-09X, Huron, SD**

DEPTH in FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE		LABORATORY TESTS				
					NO.	TYPE	WC	D	LL	PL	QU
	↓ SURFACE ELEVATION 1286.3 ft										
4½ 											

GEOTECHNICAL TEST BORING 21-771.GPJ GEOTEKENG.GDT 6/3/21



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GEOTECHNICAL TEST BORING LOG

GEOTEK # <u>21-771</u>						BORING NO. <u>9 (1 of 1)</u>					
PROJECT <u>Proposed Dakota Events Complex, South Dakota State Fairgrounds, OSE #M2321-09X, Huron, SD</u>											
DEPTH in FEET	DESCRIPTION OF MATERIAL ↓ SURFACE ELEVATION <u>1283.7 ft</u>	GEOLOGIC ORIGIN	N	WL	SAMPLE		LABORATORY TESTS				
					NO.	TYPE	WC	D	LL	PL	QU
2	FILL, MOSTLY SANDY LEAN CLAY: a trace of gravel, fine to medium grained, dark brown	FILL			1	HSA					
	SANDY LEAN CLAY: fine to medium grained, brown, dry, loose, (CL)	MIXED ALLUVIUM	6		2	SPT					
4½	CLAYEY SAND: a little gravel, fine to medium grained, dark brown, moist to waterbearing, very loose to loose, (SC)	COARSE ALLUVIUM	6		3	SPT					
			4		4	SPT					
9½	SANDY LEAN CLAY: a trace of gravel, gray, moist, firm, (CL)	GLACIAL TILL	6		5	SPT					
12	LEAN CLAY WITH SAND: a trace of gravel, gray, moist, firm, (CL)	GLACIAL TILL	8		6	SPT					
14½	CLAYEY SAND: a trace of gravel, gray, moist, medium dense, (SC)	GLACIAL OUTWASH	12		7	SPT					
16	Bottom of borehole at 16 feet.										
WATER LEVEL MEASUREMENTS						START <u>5-24-21</u> COMPLETE <u>5-24-21 2:33 pm</u>					
DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL	METHOD					
5-24-21	2:36 pm	16	--	7	7.0	3.25" ID Hollow Stem Auger					
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--	--	--	--	--	--	CREW CHIEF Roy Hanson					

GEOTECHNICAL TEST BORING 21-771.GPJ GEOTEKENG.GDT 6/3/21



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GEOTECHNICAL TEST BORING LOG

GEOTEK # <u>21-771</u>						BORING NO. <u>10 (1 of 1)</u>					
PROJECT <u>Proposed Dakota Events Complex, South Dakota State Fairgrounds, OSE #M2321-09X, Huron, SD</u>											
DEPTH in FEET	DESCRIPTION OF MATERIAL ↓ SURFACE ELEVATION <u>1285.1 ft</u>	GEOLOGIC ORIGIN	N	WL	SAMPLE		LABORATORY TESTS				
					NO.	TYPE	WC	D	LL	PL	QU
	FILL, MOSTLY SANDY LEAN CLAY: a trace of gravel, brown, stiff, Cobbles and boulders at 3 feet	FILL			1	HSA					
			11	2	SPT	18					
4½	CLAYEY SAND: a trace of gravel, fine to medium grained, brown, moist, very loose to loose, (SC)	COARSE ALLUVIUM			3	SPT					
			5	4	SPT						
9½	SANDY LEAN CLAY: a trace of gravel, gray, moist, stiff to very stiff, with lenses of sand (CL)	GLACIAL TILL		▼	5	SPT					
			15	5	SPT						
14½	LEAN CLAY WITH SAND: a trace of gravel, gray, moist, firm, (CL)	GLACIAL TILL			7	SPT					
16	Bottom of borehole at 16 feet.		8								
WATER LEVEL MEASUREMENTS						START <u>5-24-21</u> COMPLETE <u>5-24-21 1:22 pm</u>					
DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL	METHOD					
5-24-21	1:23 pm	16	--	13	▼ 10	3.25" ID Hollow Stem Auger					
--	--	--	--	--	--						
--	--	--	--	--	--						
--	--	--	--	--	--	CREW CHIEF Roy Hanson					

GEOTECHNICAL TEST BORING 21-771.GPJ GEOTEKENG.GDT 6/3/21



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GEOTECHNICAL TEST BORING LOG

GEOTEK # <u>21-771</u>						BORING NO. <u>11 (1 of 1)</u>					
PROJECT <u>Proposed Dakota Events Complex, South Dakota State Fairgrounds, OSE #M2321-09X, Huron, SD</u>											
DEPTH in FEET	DESCRIPTION OF MATERIAL ↓ SURFACE ELEVATION <u>1282.8 ft</u>	GEOLOGIC ORIGIN	N	WL	SAMPLE		LABORATORY TESTS				
					NO.	TYPE	WC	D	LL	PL	QU
2	FILL, MOSTLY CLAYEY SAND: fine to medium grained, dark brown, moist	FILL			1	HSA					
	CLAYEY SAND: a trace of gravel, fine to medium grained, brown, moist, very loose, (SC)	COARSE ALLUVIUM	4		2	SPT	13				
			3	▼	3	SPT	30				
7	SANDY LEAN CLAY: a trace of gravel, grayish brown, wet, firm, (CL)	GLACIAL TILL	5		4	SPT			37	17	
9½	LEAN CLAY WITH SAND: a trace of gravel, gray, moist, stiff, (CL)	GLACIAL TILL	11		5	SPT					
11	SANDY LEAN CLAY: a trace of gravel, gray, moist, firm to stiff, (CL)	GLACIAL TILL	8		6	SPT					
			10		7	SPT					
16	Bottom of borehole at 16 feet.										
WATER LEVEL MEASUREMENTS						START <u>5-24-21</u> COMPLETE <u>5-24-21 1:59 pm</u>					
DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL	METHOD					
5-24-21	2:04 pm	16	--	6	▼ 5.0	3.25" ID Hollow Stem Auger					
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--	--	--	--	--	--						
--	--	--	--	--	--	CREW CHIEF Roy Hanson					

GEOTECHNICAL TEST BORING 21-771.GPJ GEOTEKENG.GDT 6/3/21



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GEOTECHNICAL TEST BORING LOG

GEOTEK # <u>21-771</u>						BORING NO. <u>12 (1 of 1)</u>					
PROJECT <u>Proposed Dakota Events Complex, South Dakota State Fairgrounds, OSE #M2321--09X, Huron, SD</u>											
DEPTH in FEET	DESCRIPTION OF MATERIAL ↓ SURFACE ELEVATION <u>1284.6 ft</u>	GEOLOGIC ORIGIN	N	WL	SAMPLE		LABORATORY TESTS				
					NO.	TYPE	WC	D	LL	PL	QU
6	FILL, MOSTLY CLAYEY SAND: a trace of gravel, fine to medium grained, brown, 6 inches of gravel at the surface	FILL	9		1	SPT	13	111			
			9		2	SPT	18	105			
			6		3	SPT	13				
	Bottom of borehole at 6 feet.										
WATER LEVEL MEASUREMENTS						START <u>5-24-21</u> COMPLETE <u>5-24-21 5:10 pm</u>					
DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL	METHOD					
5-24-21	--	6	--	--	none	3.25" ID Hollow Stem Auger					
--	--	--	--	--	--						
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--	--	--	--	--	--	CREW CHIEF Roy Hanson					

GEOTECHNICAL TEST BORING 21-771.GPJ GEOTEKENG.GDT 6/3/21

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50			ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50			MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
		HIGHLY ORGANIC SOILS			PT

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

BORING LOG SYMBOLS AND DESCRIPTIVE TERMINOLOGY

SYMBOLS FOR DRILLING AND SAMPLING

<u>Symbol</u>	<u>Definition</u>
Bag	Bag sample
CS	Continuous split-spoon sampling
DM	Drilling mud
FA	Flight auger; number indicates outside diameter in inches
HA	Hand auger; number indicates outside diameter in inches
HSA	Hollow stem auger; number indicates inside diameter in inches
LS	Liner sample; number indicates outside diameter of liner sample
N	Standard penetration resistance (N-value) in blows per foot
NMR	No water level measurement recorded, primarily due to presence of drilling fluid
NSR	No sample retrieved; classification is based on action of drilling equipment and/or material noted in drilling fluid or on sampling bit
SH	Shelby tube sample; 3-inch outside diameter
SPT	Standard penetration test (N-value) using standard split-spoon sampler
SS	Split-spoon sample; 2-inch outside diameter unless otherwise noted
WL	Water level directly measured in boring
▼	Water level symbol

SYMBOLS FOR LABORATORY TESTS

<u>Symbol</u>	<u>Definition</u>
WC	Water content, percent of dry weight; ASTM:D2216
D	Dry density, pounds per cubic foot
LL	Liquid limit; ASTM:D4318
PL	Plastic limit; ASTM:D4318
QU	Unconfined compressive strength, pounds per square foot; ASTM:D2166

DENSITY/CONSISTENCY TERMINOLOGY

<u>Density</u>		<u>Consistency</u>
<u>Term</u>	<u>N-Value</u>	<u>Term</u>
Very Loose	0-4	Soft
Loose	5-8	Firm
Medium Dense	9-15	Stiff
Dense	16-30	Very Stiff
Very Dense	Over 30	Hard

PARTICLE SIZES

<u>Term</u>	<u>Particle Size</u>
Boulder	Over 12"
Cobble	3" – 12"
Gravel	#4 – 3"
Coarse Sand	#10 – #4
Medium Sand	#40 – #10
Fine Sand	#200 – #40
Silt and Clay	passes #200 sieve

DESCRIPTIVE TERMINOLOGY

<u>Term</u>	<u>Definition</u>
Dry	Absence of moisture, powdery
Frozen	Frozen soil
Moist	Damp, below saturation
Waterbearing	Pervious soil below water
Wet	Saturated, above liquid limit
Lamination	Up to ½" thick stratum
Layer	½" to 6" thick stratum
Lens	½" to 6" discontinuous stratum

GRAVEL PERCENTAGES

<u>Term</u>	<u>Range</u>
A trace of gravel	2-4%
A little gravel	5-15%
With gravel	16-50%

**SECTION 03 3000
CAST-IN-PLACE CONCRETE****PART 1 - GENERAL****1.1 SUMMARY**

- A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.
- B. This Section includes interior and exterior concrete. Floor slabs, trench drains, sidewalks, footings, and foundations are included.
- C. This Section includes under slab vapor retarder.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each concrete mixture.
- C. Shop Drawings: For steel reinforcement and coordination with other trades

1.3 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
- B. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
 - 1. ACI 301, "Specification for Structural Concrete," sections 1 through 5.
 - 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

PART 2 - PRODUCTS**2.1 FORM-FACING MATERIALS**

- A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

2.2 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.
- B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice."

2.3 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
 - 1. Portland Cement: ASTM C 150, Type I, II, or I/II Supplement with the following:
 - a. Fly Ash: ASTM C 618, Class C or F
 - b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
- B. Normal-Weight Aggregates: ASTM C 33, graded, 3/4-inch (19-mm) nominal maximum coarse-aggregate size.
 - 1. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Water: ASTM C 94/C 94M and potable.
- D. Air-Entraining Admixture: ASTM C 260.
- E. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
 - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
 - 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
 - 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
 - 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
 - 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
 - 6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.4 VAPOR RETARDERS

- A. Plastic Vapor Retarder: ASTM E 1745, Class A. Include manufacturer's recommended adhesive or pressure-sensitive tape.

2.5 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.
- C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- D. Water: Potable.
- E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

2.6 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork.

2.7 CONCRETE MIXTURES

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
- B. Proportion normal-weight concrete mixture as follows:
 - 1. Minimum Compressive Strength: 4,000 psi at 28 days.
 - 2. Maximum Water-Cementitious Materials Ratio: 0.45
 - 3. Slump Limit: 4 inches and 8 inches (200 mm) for concrete with verified slump of 2 to 4 inches (50 to 100 mm) before adding high-range water-reducing admixture or plasticizing admixture plus or minus 1 inch (25 mm).
 - 4. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch (19-mm) nominal maximum aggregate size.

2.8 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.9 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 FORM WORK

- A. Design, erect, shore, brace, and maintain formwork according to ACI 301 to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Chamfer exterior corners and edges of permanently exposed concrete.

3.2 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.3 VAPOR RETARDERS

- A. Plastic Vapor Retarders: Place, protect, and repair vapor retarders according to ASTM E 1643 and manufacturer's written instructions.
 1. Lap joints 6 inches (150 mm) and seal with manufacturers recommended tape.

3.4 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

3.5 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
 - 1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3.2-mm-) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
- D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

3.6 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
 - 1. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
- C. Cold-Weather Placement: Comply with ACI 306.1.
- D. Hot-Weather Placement: Comply with ACI 301.

3.7 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
 - 1. Apply to concrete surfaces not exposed to public view
- B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
 - 1. Apply to concrete surfaces exposed to public view, to be covered with a coating or covering material applied directly to concrete.

- C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.8 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and re-straighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
 - 1. Apply a trowel finish to interior concrete slab on grade, and other surfaces indicated
 - 2. Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-foot- (3.05-m-) long straightedge resting on 2 high spots and placed anywhere on the surface does not exceed 1/4 inch.
- C. Broom Finish: Apply a broom finish to exterior concrete sidewalks, ramps, stoops, platforms, steps, and elsewhere as indicated.

3.9 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
 - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days.
 - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 - 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

- a. Use of membrane forming curing compounds or membrane forming curing and sealing compounds shall be prohibited at all interior concrete floor slabs indicated to receive floor coverings unless approved by the flooring manufacturer.
 - b. After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.
4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.10 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

3.11 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
 1. Testing Services: Tests shall be performed according to ACI 301.

END OF SECTION 03 3000